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March 1995
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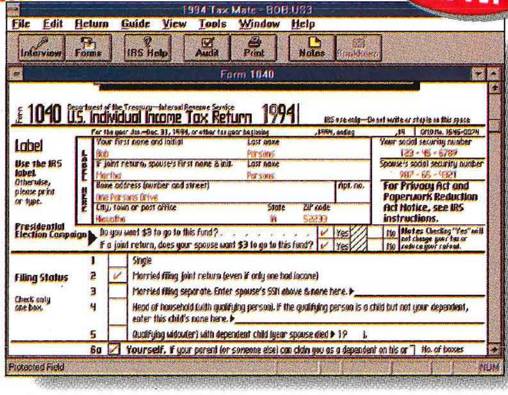

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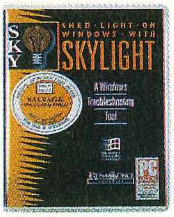
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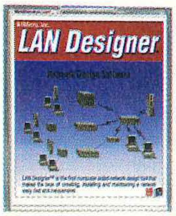

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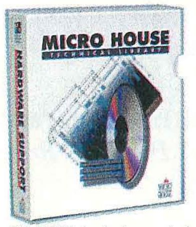

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DOS WORLD

Number 20, March 1995

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32 Play Music for Me **by Robert L. Hummel**
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48 How to Choose a Tape Drive **by Robert Hummel**
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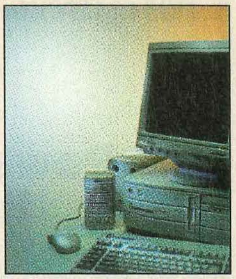
On the Cover

Pictured on the cover is the Gateway 2000 P560, a 60MHz multimedia Pentium system, equipped with a 15-inch CrystalScan 1572FS color monitor and AltecSpeak speakers from Altec Lansing.



COVER PHOTO BY LARRY DUNN

DW

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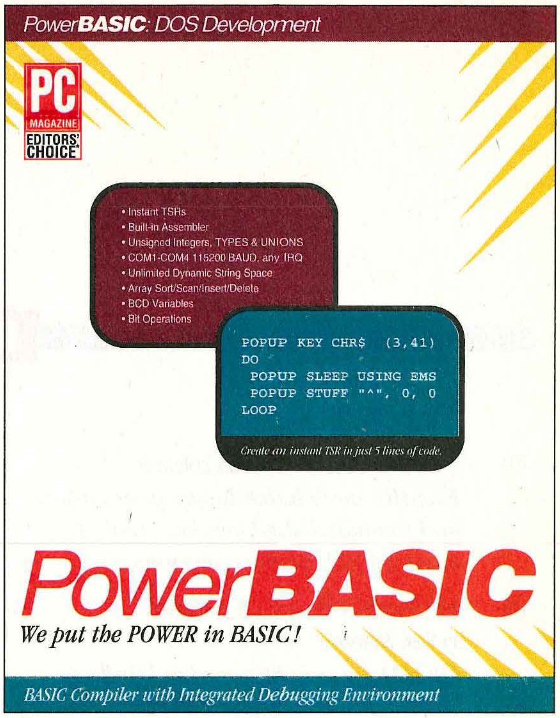
PC Magazine, *September, 1993.*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EDITORIAL

DOS 7: Now You See It, Now You Don't

by Michael J. Comendul

Twice a year I dry-clean a couple of suits and pack myself off to Comdex, the "show of shows" in the computer industry. In the fall, Comdex is held in Las Vegas, a glittering oasis separated from the rest of the world by a vast desert, the perfect Mecca for computer acolytes whose religion derives from sand and crystals.

Each year I pack up with the same questions: What will be the fate of DOS and DOS development? How shall I present our corner of Earth here at *DOS World* to those hardware manufacturers and software publishers who are increasingly obsessed with Windows development? And, of course, the one question I never seem to solve: How does the betting work in keno?

Lately, however, my worry is for naught. The technical pendulum continues to swing, and now, more than ever, vendors realize that 100 million users can't be so wrong. The question is not whether DOS is dead or alive, but rather, since it's impossible to eradicate, how we can best take advantage of it.

A number of authorities agree. Our own Rob Hummel uses this argument with software producers: "Oh, sure, people *say* DOS is dead, but it's still the single most compelling and commonly accepted standard of what *your* product has to do to make it onto a dealer's shelf. Ignore it at your peril." And isn't he really right?

In Las Vegas, I caught up with Andrew Schulman, a developer and respected computer-book author, whose most recent offering, *Unauthorized Windows95* (IDG Books), confirms what many beta-testers and developers of "Chicago" software have supposed: that Windows95—as currently designed—doesn't do away with DOS at all. In fact, Schulman ultimately praises the new operating system, precisely because it makes compromises in every practical way to DOS. Schulman did tell me that Windows95 will certainly eliminate the need for some product categories and invalidate DOS versions of others—chiefly caching utilities and some hard-disk management tools.

Brian Livingston, a journalist who follows Windows development, elaborated on some of Schulman's findings. One file, the valuable MSDOS.SYS, still exists under Windows95 and works like CONFIG.SYS. It's a hidden, read-only text file, and, as such—if you can access it—it, too, is editable.

Finally, we have Microsoft's own magic act about DOS: Now you see it, now you don't. Even Microsoft doesn't deny that DOS 7 exists, only that it will be available as an upgrade. *PC Week* reports that Microsoft *will* accommodate customers who want to bypass the Windows interface and receive a DOS upgrade. The same report, however, quotes Rich Freedman, Microsoft Corporation's Windows product manager, as saying, "There is no demand for a DOS uncoupled from Windows95." Well, we'll see about that.

As for my other worry—you know, about betting at keno . . . . Well, I've adopted a new, more-aggressive attitude to cover my shortcomings. After all, how could I be satisfied with a game whose chief tactical weapon is a blue crayon? ■

DOS WORLD

Letters to the Editor

DOS Advisory

I've found what I believe is a dangerous bug in MS-DOS 6.2's COPY and XCOPY commands.

I have a 3.5-inch floppy disk full of utility software I use to diagnose PC problems. Recently, I used COPY to place an updated version of one of the utilities on this disk. In response to DOS's overwrite confirmation message, I typed `Y` and pressed Enter. DOS then issued an "Insufficient disk space. 0 file(s) copied" message.

Because the updated utility was larger than the old one, it didn't fit on the floppy disk. When I displayed a directory of the floppy disk, I found that the original version of the utility was gone. I used UNDELETE to restore the program, but the resulting file contained an error. When I subsequently checked the disk with DOS's CHKDSK and SCANDISK, they reported cross-linking and FAT errors.

I think your readers should know that if they use COPY or XCOPY to overwrite an existing file with a new file that's too large to fit on the disk to which they're copying, they'll lose the original file.

Stephen F. McConnell
Kingsport, Tenn.

What you've uncovered isn't a bug, but rather a side-effect of DOS's mode of operation. Because it's a processed-based operating system, rather than a transaction-based system, it proceeds to do something and then reports on the results. If it were transaction based, it would instead guarantee that nothing would change unless and until the process is completed successfully.

Nonetheless, your warning is valid, and we're passing it along in hopes it will spare other readers the frustration you experienced.

—Eds.

Further Insight

Hardin Brothers' proposed solutions to Thomas Dunnahoo's broken batch file ["A Wrench in the Works," *DOS World* #17, September 1994, page 19] were well taken, but I believe the real solution lies in a different direction. I'd be willing to bet that Dunnahoo's problem began when he decided to try the command ECHO Y | DEL. In all likelihood, he placed a REM statement in front of the original line in DELA.BAT and added the ECHO line. DELA.BAT would then have looked like this:

```
REM DEL *.* <C:\BAT\Y.TXT
ECHO Y | DEL
```

This doesn't work, because when DOS boots, it maintains two file handles for input and output. By default, these handles are mapped to the console. When DOS executes a batch file, it first replaces any variables with their values, then searches for any piping or redirection commands and initializes the necessary files. Because this takes place before the other parts of the commands are carried out, the REM is ignored.

If he checked the file named Y.TXT, I think Dunnahoo would find it's a zero-length file. When he tried to return to his original DELA.BAT file, Y.TXT no longer contained the necessary redirected input. His computer didn't hang up; it was simply waiting for further input. Pressing Ctrl+Break would have returned him to the DOS prompt.

To eliminate this problem, Dunnahoo should remove one of the offending lines, or enclose the unused redirection symbol in double quotations marks: "<".

Allen Burdic
Myrtle Creek, Ore.

"ANSI MAGIC" CORRECTIONS

The program listing for MENU.BAT published in *DOS World* #18, November 1994 (page 40), contains a number of errors. The article should actually contain four listings, not one. The Main Menu, Utilities, and Format sections, which appear at the end of the original listing, should in fact be three separate files: MAIN.TXT, UTIL.TXT, and FORMAT.TXT.

In addition, other errors in the listing prevent the batch file from working properly. The accompanying listings (pages 8 and 9) correct these errors.

You must store the three text files—MAIN.TXT, UTIL.TXT, and FORMAT.TXT—on your hard drive in the same directory from which you run

ORIGINAL LINE	MODIFIED LINE
type main.txt	type c:\myfiles\main.txt
type util.txt	type c:\myfiles\util.txt
type format.txt	type c:\myfiles\format.txt

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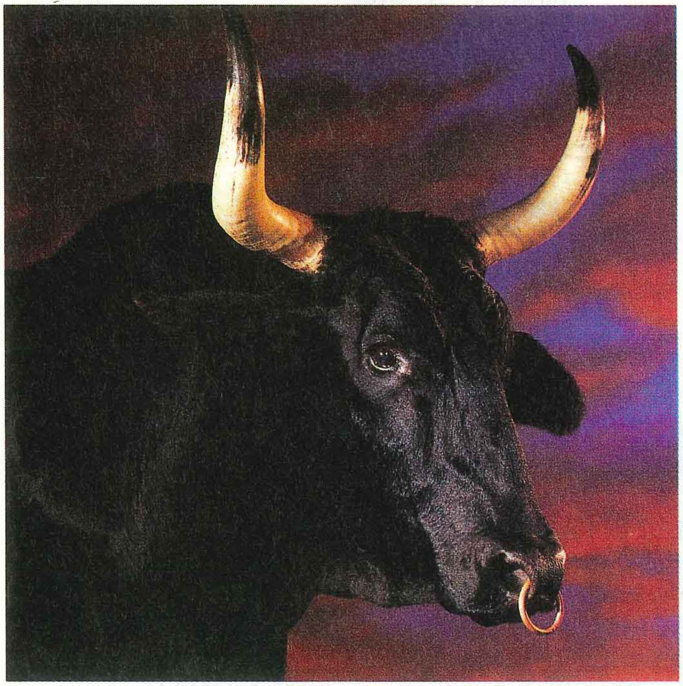

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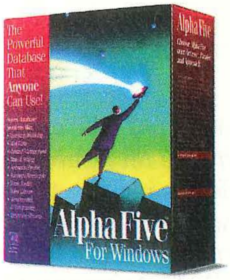

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MENU.BAT generates snazzy-looking menus, complete with shadowing and special effects. It requires that MAIN.TXT, UTIL.TXT, and FORMAT.TXT also be present on your hard drive.

```
@echo off
:Start
type main.txt
choice /c1234← /n ←[21;20fEnter your choice:
if errorlevel 5 goto Exit
if errorlevel 4 goto Utils
if errorlevel 3 goto Lotus
if errorlevel 2 goto WordPerfect
if errorlevel 1 goto Windows
goto Exit

:Utils
type util.txt
choice /c1234← /n ←[21;20fEnter your choice: ←[D
if errorlevel 5 goto Start
if errorlevel 4 goto DailyBU
if errorlevel 3 goto WeeklyBU
if errorlevel 2 goto Format
if errorlevel 1 goto Scan
goto Exit

:Lotus
cd \123R23
123
goto Start

:WordPerfect
cd \wp50
wp
goto Start

:Windows
cd \windows
win
goto Start

:DailyBU
cd \dos
msbackup incrc
type main.txt
goto Utils

:WeeklyBU
cd \dos
msbackup fullc
type main.txt
goto Utils
```

```
:Format
type format.txt
choice /c1234← /n ←[21;20fEnter your choice: ←[D
if errorlevel 5 goto FormatEsc
if errorlevel 4 goto B720
if errorlevel 3 goto B144
if errorlevel 2 goto A360
if errorlevel 1 goto A12
goto Exit

:Scan
scandisk
type main.txt
goto Utils

:FormatEsc
echo ←[34;46m
cls
type main.txt
goto Utils

:B720
cls
format b: /f:720KB
type main.txt
goto Utils

:B144
cls
format b:
type main.txt
goto Utils

:A360
cls
format a: /f:360KB
type main.txt
goto Utils

:A12
cls
format a:
type main.txt
goto Utils

:Exit
echo ←[37;40m
cls
```

End

MENU.BAT. Alternatively, you can change all references to those three files to include their full paths. For instance, if MAIN.TXT, UTIL.TXT, and FORMAT.TXT are located in a directory called C:\MYFILES, you could change all occurences of the appropriate lines in MENU.BAT as indicated in the accompanying table (page 6). If you modify MENU.BAT this way, you'll be able to run it from anywhere on your hard drive. —*Eds.*

CORRECTIONS AND UPDATES

Bad Command or Filename

We've uncovered errors in listings published in the September 1994 (#17), November 1994 (#18), and January 1995 (#19) issues of *DOS World*.

As written, TRASHCAN.BAT (see "Systematic Trash Removal," September, page 25) counts only to nine. To get it to count to ten, substitute the following four lines for the original listing's third and fourth lines:

```
IF NOT EXIST C:\TRASHCAN\*.010
  GOTO SKIPTO10
DEL C:\TRASHCAN\*.010
:SKIPTO10
IF NOT EXIST C:\TRASHCAN\*.009
  GOTO SKIPTO9
```

The second line of Rob Hummel's Debug script SAYAT.SCR (page 32 in

MAIN.TXT: Main Menu text file for MENU.BAT.

```
←[34;46m
←[2J
←[1;37;44m
←[5;20f╔════════════════════════════════════╗
←[6;20f║         M A I N   M E N U          ║←[40m  ←[44m
←[7;20f╟────────────────────────────────────╢←[40m  ←[44m
←[8;20f║                                    ║←[40m  ←[44m
←[9;20f║       1. Windows                   ║←[40m  ←[44m
←[10;20f║       2. WordPerfect               ║←[40m  ←[44m
←[11;20f║       3. Lotus 1-2-3               ║←[40m  ←[44m
←[12;20f║       4. Utilities                 ║←[40m  ←[44m
←[13;20f║                                    ║←[40m  ←[44m
←[14;20f╚════════════════════════════════════╝←[40m
←[15;22f                                      ←[0;34;46m
←[22;20fPress Esc to Exit.
```

UTIL.TXT: Utilities menu text file for MENU.BAT.

```
←[1;37;41m
←[8;25f╔══════════════════════════════════════╗
←[9;25f║         U T I L I T I E S            ║←[40m  ←[41m
←[10;25f╟──────────────────────────────────────╢←[40m  ←[41m
←[11;25f║                                      ║←[40m  ←[41m
←[12;25f║        1. Scan hard disk             ║←[40m  ←[41m
←[13;25f║        2. Format a disk              ║←[40m  ←[41m
←[14;25f║        3. Weekly backup              ║←[40m  ←[41m
←[15;25f║        4. Daily backup               ║←[40m  ←[41m
←[16;25f║                                      ║←[40m  ←[41m
←[17;25f╚══════════════════════════════════════╝←[40m
←[18;27f                                        ←[0;34;46m
←[22;20fPress Esc to return to Main Menu.
```

FORMAT.TXT: Format menu text file for MENU.BAT.

```
←[34;47m
←[8;17f╔══════════════════════════════════════════════════╗
←[9;17f║                  F O R M A T                     ║←[40m  ←[47m
←[10;17f╟──────────────────────────────────────────────────╢←[40m  ←[47m
←[11;17f║                                                  ║←[40m  ←[47m
←[12;17f║  1. Drive A - 1.2MB      3. Drive B - 1.44MB     ║←[40m  ←[47m
←[13;17f║  2. Drive A - 360K       4. Drive B - 720K       ║←[40m  ←[47m
←[14;17f║                                                  ║←[40m  ←[47m
←[15;17f╚══════════════════════════════════════════════════╝←[40m
←[16;19f                                                    ←[34;46m
←[22;20fPress Esc to return to Utility menu.
```

"PC Toolbox: Put Some Life in Your Batch Files," September) should read as follows:

```
A 100
```

Note that the characters following the 1 are zeros, not *O*s.

The tip "Putting on the Digital Brakes" (November, page 19) says to add SET DIRCMD=DIR /P to your AUTOEXEC.BAT file to make DOS display a directory one page at a time whenever you type DIR at the DOS prompt. The correct command is as follows:

```
SET DIRCMD=/P
```

In "Q&A" (November, page 66), the third line of the batch file FMAT.BAT should read as follows:

```
FORMAT %1 /V:%2 < C:\DOS\NO.DAT
```

This modification assumes that NO.DAT resides in your C:\DOS directory. If you put the file elsewhere, change this line accordingly. Note that /V: is the required syntax for FORMAT's label switch.

In addition, although the instructions for creating NO.DAT are correct, the explanation of its function is unclear. NO.DAT contains a carriage return, the character *N*, and a second carriage return. The first carriage return answers FORMAT's "Insert new diskette for drive A: and press ENTER when ready" prompt. The *N* and the second carriage return answer FORMAT's "Format another disk (Y/N)" prompt.

In "Three Ways to Beat the Batch" (January), the initial programming instruction near the top of the first column on page 40 should read as follows:

```
COPY CON SETIT.DAT
```

The MARK1.BAT batch file won't work unless SETIT.DAT is created first.

On page 42 of that same article, lines 6 and 7 of the MARK3.BAT batch file should read:

```
ECHO SET CURDIR=>C:\BAT\SETIT.DAT
NOCTRL <C:\BAT\SETIT.DAT>C:\BAT\SETIT.BAT
```

As printed originally, the batch file fails if you're not in the C:\BAT directory when you run it. Lines 8 through 11 look for SETIT.BAT and SETIT.DAT in the C:\BAT directory; but because the original lines 6 and 7 don't contain references to C:\BAT, SETIT.BAT and SETIT.DAT may not be in that directory.

With the changes noted above in place, the MARK3.BAT batch file will perform as described in the first column on page 43.

In Robert L. Hummel's "Just for Kicks: Method 4" sidebar to the article (page 43), the fourth line of MARKIT.BAT should read:

```
E 100 "SET CURDIR="
```

—Eds.

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DOS WORLD

Tips from Readers

Coming Up Blank

In the September 1994 issue [*DOS World* #17, "Tips from Readers," page 9], Jason Cannon offers a batch file and a QBasic program he uses to blank his screen. My three-line batch file is simpler:

```
@ECHO OFF
CBS
PAUSE > NUL
```

Peter Childress
San Francisco, Calif.

Open Says Me, Revisited

Vagn Grøndahl ["Open Says Me," *DOS World* #15, May 1994, page 55; clarification, "Different Strokes for Different Versions," *DOS World* #17, September 1994, page 5] suggested a method for altering QBASIC.EXE so that EDIT.COM's Open option displays all files in a directory. (By default it displays only TXT files.) If you don't have a disk editor or don't want to alter a DOS file, try this instead.

At EDIT.COM's opening screen, press Esc, select the File menu's Open option, change the wildcard in the Filename box to read *.*, and press Enter. You can then use a mouse (or the Tab key and the up- and down-arrow keys) to change to another drive and see a complete list of files. The disadvantage to this method is that you must repeat it every time you start EDIT.COM without specifying a filename. But you don't have to worry about messing up a DOS file.

You may use the same technique in QBASIC.EXE. Just remember to load only ASCII files. If you load other types of files, you may corrupt them. If you save a corrupted program file back to disk, it won't run properly.

Cal Callender
Goderich, Ontario
Canada

A Measure of Security

I have a way to delete files so that they can't be undeleted and read. First, I copy a larger file over the one I want to erase; then I delete the copied file. For example, if COMMAND.COM is longer than a file called D:\FINANCES\MY_BANK.TXT, I use this sequence:

```
COPY C:\DOS\COMMAND.COM
  D:\FINANCES\MY_BANK.TXT
DEL D:\FINANCES\MY_BANK.TXT
```

To automate the procedure, I use this batch file, called SDEL.BAT:

```
@ECHO OFF
COPY C:\DOS\COMMAND.COM %1
  /Y > NUL
REN %1 A
DEL A
```

To use it, type this at the DOS prompt:

```
SDEL filename
```

where *filename* is the name of the file you want to erase.

Juan Martínez
Mexico City
Mexico

As Martínez mentions, this method works only if the file you overwrite is smaller than 50K (the approximate size of COMMAND.COM). Even then, sensitive information isn't completely secure. To keep your data from prying eyes, use a special disk utility, such as The Norton Utilities' WIPEINFO.EXE, to clean up directory entries, obliterate the Delete Sentry directory, and scrub all areas of the disk that aren't allocated. The National Security Administration could probably recover the data after that, but it would be beyond the reach of office snoops.

—Eds.

Dual-Purpose Cursor Control

After reading "Controlling Your Cursor," [*Maximum DOS*, Special #4, June 1994, page 72], I wondered whether you really need two programs to control the cursor, so I studied the programs and considered math courses I'd taken. My Debug script, CURSOR.SCR (below), is proof that you can turn the cursor on and off with just one program.

The idea behind the program is simple. Other cursor-control programs I've seen use the Boolean operators AND and OR to turn the

Use the Debug script CURSOR.SCR to create CURSOR.COM, a program that lets you turn the cursor on and off. When typing in the listing, be sure to include the blank line as shown.

```
N CURSOR.COM
A 100
MOV AH,3
XOR BX,BX
INT 10
XOR CH,20
MOV AH,1
INT 10
RET

RCX
E
W
Q
```

End

Updated & Revised

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cursor on and off. I employ XOR to handle both tasks. To use my listing, type it into an editor that saves files in ASCII (text) format, and name it CURSOR.SCR. To create the executable program CURSOR.COM, type this command at the DOS prompt:

```
DEBUG < CURSOR.SCR
```

To run the program, type CURSOR.

Joseph L. McCay
Manchester, N.H.

Front-End Realignment

I've written a short program, called PREFIX.COM, that lets my batch files add a string to each line of another batch file and send the new lines to a secondary file. After creating the executable program from the Debug script, shown below (type `DEBUG < PREFIX.SCR` at the DOS prompt), you can use it in many ways, including capturing the time and saving it in an environment variable.

To understand how it works, first create the following four-line batch file and name it GETTIME.BAT:

```
@ECHO OFF
ECHO.|TIME|PREFIX CALL TIMESUB
  > TIMEGET.BAT
CALL TIMEGET
ECHO The current time is
  %CURRTIME%
```

Then create a second batch file, TIMESUB.BAT, which contains just two lines:

```
@ECHO OFF
IF %1X==CURRENTX SET CURRTIME=%4
```

When you run GETTIME.BAT, PREFIX accepts the output of the TIME command as input. (ECHO. sends a carriage return, which provides a response to TIME's "Enter new time:" prompt.) That output will consist of four elements: the words *Current*, *time*, and *is*, plus the actual time:

```
Current time is 12:11:41.56p
```

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PREFIX.COM then prefaces the above string with CALL TIMESUB; DOS stores this line in the file TIMEGET.BAT:

```
CALL TIMESUB Current time is
  12:11:41.56p
```

The next line of GETTIME.BAT calls this newly created batch file, checks to see whether the first parameter of the command in TIMEGET.BAT is *Current*, and, if it is, sets the current time to the fourth parameter, 12:11:41.56P. Control returns to GETTIME.BAT, and the following (more grammatical) message is displayed on screen:

```
The current time is 12:11:41.56p
```

Another way you might use PREFIX.COM is to back up DOC files. If you need to back up every file in the current directory and add the names to a database of backup files, use the following DOS command:

```
DIR *DOC /B | PREFIX CALL
  MYBATCH > X.BAT
```

The X.BAT file might then contain entries such as these:

```
CALL MYBATCH FILE.DOC
CALL MYBATCH FILE2.DOC
CALL MYBATCH FILE3.DOC
```

James K. Lawless
Council Bluffs, Iowa

Use the Debug script PREFIX.SCR to create PREFIX.COM, a program that lets you add a string to the beginning of each line of a text file. When typing in the listing, be sure to include the blank line as shown.

```
N PREFIX.COM
A
PUSH   CS
POP    DS
MOV    DX,0157
MOV    [0155],DX
MOV    AH,3F
MOV    BX,0000
MOV    CX,0001
MOV    DX,[0155]
INC    WORD PTR [0155]
INT    21
CMP    AX,0000
JNZ    0125
MOV    AX,4C00
INT    21
PUSH   DX
POP    SI
MOV    AH,[SI]
CMP    AH,0A
JZ     0130
JMP    0109
PUSH   AX
MOV    BX,0001
XOR    CH,CH
MOV    CL,[0080]
MOV    DX,0081
MOV    AH,40
INT    21
MOV    AH,40
MOV    BX,0001
MOV    CX,[0155]
SUB    CX,0157
MOV    DX,0157
INT    21
JMP    0102

RCX
155
W
Q
```

End

READER FORUM

The Request Line Is Open

by Hardin Brothers

Most months, the questions for this column seem to follow a theme: inquiries about hardware or a particular kind of software, DOS difficulties, or problems with the DOS batch language, for example. But this month the questions seem to come from all over the map. Actually, if I had a question from Vancouver or Anchorage, I could say that they come from the four corners of North America. The other three corners are well represented.

> *I should never imply that something can't be done on the computer; there's a way to accomplish almost any task, and the solution is often simple.*

More on IRQs

The first item comes from Jeff Hirschfeld of Manhattan Beach, California:

I enjoyed your article on IRQs ["Solving IRQsome Problems," DOS World *#17, September 1994, page 26], and when I ran DOS's MSD program, my display looked amazingly like yours. I have only one available IRQ left. Does that mean I can add only one more option to my computer? What if I want to use more IRQs than are available? Also, what are those "reserved" IRQs? Can I use them?*

Many hardware devices use an IRQ, or *interrupt request* line, to tell the computer they need immediate attention. For example, every time you press or release a key, the keyboard sends a signal over IRQ1 to tell the computer that it had better stop what it's doing and check out the keyboard.

Many add-in boards that control hardware devices need an IRQ line to function properly. Short, or 8-bit, cards can use only IRQs numbered from 0 to 7, which have been available on all IBM computers and clones since the days of the PC and PC/XT. Long, or 16-bit, cards can also use IRQs 8 through 15, which are available on all 80286, 386, 486, and Pentium systems.

Unfortunately, several IRQs are reserved for internal hardware: the timer tick, keyboard, serial and parallel ports, floppy and hard disks, and so on. If you add a number of extras to your computer, including network cards, scanners, CD-ROMs, and tape drives, you may find that you don't have any IRQs left for the next device you want to install.

If you run out of available IRQs, or if you need to install a card that won't use one of your available IRQs, you have a couple of choices. The most painful is to pull out the instructions for every other card you've added to your computer, to see whether you can switch one of them to a new IRQ address and make room for the new card. If you do that, though, you'll probably have to reconfigure the software drivers to match the IRQ changes.

A second option is to use one of the "reserved" IRQs shown on MSD's display. In this case, "reserved" means "IBM said not to use this IRQ when the company released the PC/AT because it might be used at some later date by an IBM add-in board." But as far as I've been able to determine, none of those "reserved" IRQs are used by any IBM equipment.

A third choice is to double up on one or more IRQs. You can't use the same IRQ for two devices operating at the same time, at least not if your computer has a standard AT or ISA bus: The computer won't be able to tell which device has requested service. But sometimes you can guarantee that you won't use two conflicting devices at the same time. For example, I've installed a tape-backup board that uses the same IRQ as my floppy-drive system, because I know I won't be running the floppy disks when the tape software is running.

The best way to manage IRQs, along with other scarce resources, such as DMA channels and I/O ports, is to start an installation notebook (or at least a text file) from the moment you unpack your computer. Write down the name of every device you add to your computer; the IRQ, DMA, and port channels it uses; the alternatives when you installed it; and instructions for setting the driver software if you make changes. This little notebook may help you install your next sound card or CD-ROM driver in ten minutes instead of a grueling two or three days spent pulling your hair out and calling all over the country for technical support.

A Better KEYGET?

Moving from the Southwest to the Southeast, the next letter comes from Ray Johnston of Sarasota, Florida:

Since I've requested assistance on two previous problems with no luck, I'm hoping someone at DOS World *can help me out this time. I use the KEYGET.COM program from page 26 of the May 1993 issue [#9], but it's limited because it allows only one keystroke. Is there a COM program that would let me capture multiple keystrokes from the keyboard and store them in %1 in a batch file or somewhere else? It must be possible, because commercial programs include this option.*

Several commercial and shareware batch-file enhancement programs can capture strings from the user. Most of them store the results in the environment. They must resort to using undocumented information in DOS to find and manipulate the environment and add the necessary data (if there's room). Their job is complicated because they have to use different techniques depending on the version of DOS running and whether the batch file and enhancer are running from the parent version of COMMAND.COM or from a DOS shell.

The shareware program 4DOS (JP Software, 800-368-8777 or 617-646-3975; $49 plus $6 shipping) or its commercial cousin NDOS (part of The Norton Utilities from Symantec, 800-441-7234 or 408-253-9600; $179) can also capture user input and store it in the environment. They have an easier time doing so because they replace COMMAND.COM and, therefore, manage the environment directly.

If you want a "pure" DOS method for capturing input from the user, see "When a Simple Y/N Won't Do" ("Batch-File Medic," *DOS World* #13, January 1994, page 36). The technique I presented there lets users type in information passed to the batch file in its %1, %2, and so on, parameters.

I don't have room here to repeat and explain that technique fully, but in essence, it captures the user's input via redirection, then adds that input to a new batch file that restarts the original program. To make everything work, I had to create and use a simple COM program that removes carriage returns and linefeeds from a file and turns them into spaces.

It would certainly be possible to develop a COM or EXE program that would do everything you ask: prompt the user for input and store that input in the environment. The resulting program would be much too long for a simple Debug script, however, and would probably be written best with either an assembler or a C compiler. It would also require several hundred lines of program code, which puts the project outside the limits of what we normally publish in this magazine.

Finally, we're sorry that we haven't answered your other questions. We get more letters for this and the other columns in the magazine than we have room to print. We don't want to discourage anyone from writing to us, but we aren't able to answer all the questions we receive.

Oops! I Goofed

From Florida, we move to the northeast corner of North America and a gentle scolding from Bill Goldston of Sydney, Nova Scotia:

In your article "Turn Up the Volume," DOS World *#17 [September 1994, page 34], you state that you know of no way to collect the serial number of a disk instead of a disk label. Try the following method. This batch file must be called VOLUME.BAT:*

Want to Know More?

If you have a question, or need further help with something that has appeared in* DW*, write:

Reader Forum
DOS World
80 Elm St.
P.O. Box 802
Peterborough, NH 03458-0802

Please include a copy of your AUTOEXEC.BAT and CONFIG.SYS files on disk if you have particular problems with software or hardware conflicts and compatibility.

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```
@ECHO OFF
IF "%2"=="Number" GOTO Display
ECHO. | VOL %1 | FIND "Serial" > TEST.BAT
TEST
:Display
ECHO The serial number of the disk is %4
DEL TEST.BAT
```

Mr. Goldston is correct and points up two things I should always remember. First, I should never imply that something can't be done on the computer; there's a way to accomplish almost any task, and often the solution is simple. Second, I often suffer from mental tunnel vision. When I wrote the column to which he refers, I'd completely forgotten about using DOS's FIND filter to collect information.

If VOLUME.BAT looks a little cryptic to you, start by typing `VOL` at the DOS prompt (or `VOL A:` if you want information about the disk in drive A). You'll see two lines of output. The first will say something like "Volume in drive . . ." and give you the name of the disk. The second will say something like "Volume Serial Number is . . ." and display the disk's eight-digit serial number.

In VOLUME.BAT, ignore the first two lines for a minute. The third line pipes a carriage return (using ECHO. |) to the VOL command. If you started the original program by typing `VOLUME A:`, the VOL command will be VOL A:. If you typed just `VOLUME` without a drive name, %1 will be empty, and the command VOL will generate information about the current drive.

Whatever information VOL creates is piped to the FIND filter, which looks for a line containing the word *Serial*. When it locates that line, FIND sends it to a file called TEST.BAT. Within TEST.BAT there will be just one line, beginning "Volume Serial Number is . . . ."

The fourth line of VOLUME.BAT runs TEST.BAT as a new batch file. When TEST.BAT starts, it runs a command called VOLUME, the first word on its only line. That command will restart VOLUME.BAT, but this time it will receive the word *Serial* as %1, *Number* as %2, and *is* as %3. The actual serial number of the disk in question will be stored in %4.

When VOLUME.BAT starts this time, the test in the second line will send control to the section labeled *:Display*, starting in line 5. Line 6 will display the serial number, which the batch file received in the variable %4. The final line will erase the temporary batch file called TEST.BAT.

I apologize for missing this technique in the original column, and thank Mr. Goldston for this correction, which is an example of excellent batch-file programming.

Problems with CHKDSK

After letters from three of the four corners of the map, the last letter this month comes from a place closer to the center. Bob Masson of Huntsville, Alabama, has a common problem with CHKDSK:

> *I read "Chucking CHKDSK" in the November 1994 issue ["Reader Forum,"* DOS World *#18, page 22] with interest. The writer was having problems rebuilding data from lost clusters that CHKDSK had put into FILEnnnn.CHK files. I should be so lucky. I rarely find a file generated by CHKDSK, but when I do, it's useless because it's written in machine language. I usually end up deleting the file and hoping for the best. If anyone has a magic formula for converting these machine-language files to ASCII, I'd appreciate hearing about it.*

When CHKDSK finds a group of "lost" clusters—clusters reserved in the file-allocation table (FAT), but not assigned to any existing file—it simply makes up a filename to hold each block. CHKDSK has no way of knowing where those clusters were originally assigned or whether they were meant to be abandoned.

What can you do with the FILE*nnnn*.CHK files CHKDSK creates? Usually nothing at all, except delete them and, as you say, hope for the best. Even if they contain some ASCII data, it will often be from the middle of a file or partially overwritten by other data. And you'll have no way of knowing whether the data is current or left over from an outdated version.

A more-important question is why lost clusters turned up on your hard drive in the first place. Perhaps your computer locked up or the power failed while a program was writing to a file. Or perhaps you've developed the terrible habit of turning off your computer without closing all programs, exiting from Windows if you use it, returning to the DOS prompt, and then waiting a few seconds to make sure the disk cache is empty.

If you can't blame a power outage, a lock-up, or bad computing practices for the lost clusters, your hard disk may be failing. Make sure you keep a current backup of your hard disk, because it may fail suddenly. Use a surface-scanning program such as DOS's ScanDisk, The Norton Disk Doctor (in The Norton Utilities from Symantec, 800-441-7234 or 408-253-9600; $179), or SpinRite (Gibson Research, 800-736-0637 or 714-362-8800; $89).

But most important, in my opinion, is to stop relying on CHKDSK at all. Using CHKDSK to fix a hard-drive problem is like using a sledgehammer to fix a diamond necklace. It may or may not take care of the difficulty, and it may cause new glitches. Instead, pick a reputable disk-maintenance program and use it regularly. ■

Technical Editor Hardin Brothers has been working with computers and writing about them for 15 years.

SHAREWARE EXCHANGE

Shattering Stereotypes

by Hardin Brothers

One of the benefits of writing this column is that I get to try dozens of new software packages each month. Each time I load a new program onto my computer, uncompress it, and start it up, I feel like a kid tearing the paper off a birthday present. I haven't heard of most of the programs I receive from readers, and I'm often impressed by the high quality of the software I receive. This month, there's something for everyone here. All the programs I discuss in this column are available on the *DOS World* BBS (603-924-3181), as well as from most information services and local BBSes. (See the accompanying sidebar, "Share the Wealth," opposite, and the "*DOS World* BBS" section of "How to Use This Magazine," page 80, for details on using the bulletin board. Prices are listed in the "Product Information" box, page 20.)

> *After a while, most run-of-the-mill graphical interfaces begin to look the same—but a program that supports interactive RIP graphics is stunning to behold.*

Stunning BBS Graphics

The first nomination this month comes from Paulo Shakarian of Cleveland, Ohio:

If there were a DOS comm program that had full RIP support, Z-modem downloading, VT-102 and ANSI, mouse support, and on-line help, you'd download it, wouldn't you? And the best part is—it's free!

Maybe I've been living in the Dark Ages. My idea of a shareware terminal program has always been something like the early ProComm, which had all the visual interest of a blank wall. But **RIPTerm** has completely shattered that stereotype.

RIPTerm requires an EGA or VGA system because it runs in graphics rather than text mode. When you start it up, you see a graphical title screen and then a blank screen with a status bar at the bottom. Hold down the right mouse button or press F10, and a menu bar will appear at the top of the screen. Press F1 and a full-page table of contents for the RIPTerm help system is displayed, complete with mouse and cursor controls to select individual topics.

RIPTerm includes many other elements you might expect to find in a full-featured terminal package. Dialing directories hold up to 100 names and phone numbers each, and keep track of how often you've called a number and when you last connected to it. RIPTerm also offers keystroke macros, hot keys for common activities, a scroll-back buffer to review text received from a remote computer, and the ability to maintain a session log on the printer or in a text file.

But the most-interesting thing about RIPTerm is that it runs in graphics mode. Before you log onto a BBS or information service, the graphics screens are okay, but not terribly interesting. After a while, most graphical user interfaces begin to look the same: sculptured text-entry fields, buttons that appear pressed when the mouse clicks on them, and so on. RIPTerm provides all of these features, too, but after a few minutes, you might wonder why it bothers; I've seen text interfaces that are almost as attractive.

The answer comes when you log onto a BBS that supports RIP graphics. Instead of the standard white-on-black introductory screen or a mishmash of ANSI graphics, you'll see a fully interactive graphics screen. The BBS controls the graphics on your screen by using icon and font files included in the RIPTerm package. You navigate through the BBS by clicking on buttons with a mouse or by pressing hot keys. The effect, at least at first, is stunning. I've found several local BBSes that include RIP graphics; I had logged onto many of them before and found them unremarkable, but with RIPTerm, they were much more attractive.

I'm not sure I'd use RIPTerm regularly for information services and BBSes that don't support its brand of graphics. RIPTerm 1.54.00 is freeware to support the bulletin-board systems that use Galacticom's Major BBS software. (Version 2.0 is a $10 shareware program.) Many do, and if you log onto them, give RIPTerm a try.

A Better Batch

The second program this month comes from Patty King of Atlanta, Georgia:

I've mastered Basic and tried my hand at C, but PB Plus+ lets me write computer programs that actually run. It's fun. I can create programs that look professional, and they work. I don't have to struggle for days or weeks trying to get something to run.

PowerBatch started several years ago as a batch-file enhancement program, but it has become much more than that. Today, it's a full language in its own right, and one that's very easy to use.

You use your favorite editor to write a program in PowerBatch and then run POWERMAK.EXE to turn your program into an executable file you may distribute freely. The PowerBatch language is easy to learn and is somewhat like the DOS batch language. PowerBatch is certainly less complex than QBasic or languages like C and Pascal.

Once you understand some general concepts, you can use PowerBatch to create almost any kind of program you want. The POWERMAK compiler does a good job of catching errors in your program. Generally, any program it can compile has a good chance of running properly. PowerBatch programs can take advantage of DOS services and can run other applications easily. PowerBatch includes commands for system information, such as the existence of drives, directories, and files; for arithmetic; and for creating and handling boxes and windows.

PowerBatch is available as shareware and as a registered program. If you enjoy the shareware program, you'll probably want a registered copy of PB Plus+ instead of PowerBatch. PB Plus+ is PowerBatch with some important additions. The programs you write with PB Plus+ offer all the capabilities of PowerBatch programs plus mouse control, arrays, the ability to read from files, and many other features.

Whether you're a beginning programmer or an experienced pro who wants to create demos and prototypes fast, you owe it to yourself to try PowerBatch. Beginners may be confused at first by the documentation, but if you work with the many examples included with the program, you shouldn't have any trouble learning it and using it.

Another DOS Shell

Sometimes I'm amazed by the number of DOS shells we receive for consideration. I imagine that almost every shareware author has created a DOS shell at one time or another. But this one, nominated by Phil Bernstein of Pleasant Valley, New York, may be unique:

***ArcMaster** is a great utility program for zipping and unzipping files. It handles ZIP, ARC, ZOO, LHA, and all other popular file formats. It can also display two directories at the same time and compress an entire directory with a single command. It's a very useful tool, and it's easy to use.*

I've watched ArcMaster (short for *Archive Master*) develop from a simple compression utility into a full DOS shell. It works with almost every shareware

SHARE THE WEALTH

"Shareware Exchange" invites you to send a copy of your favorite shareware program, along with a description and an explanation of why you like it (500 words or less), to Shareware Editor, *DOS World*, 86 Elm St., Peterborough, NH 03458. Tell us how we can obtain a copy of the program. We'll pay contributors $50 for each program featured in this column. Please don't send us shareware you've written—we want recommendations from users, not authors. You can contact us on CompuServe at 75300,2361 or on the *DOS World* bulletin-board system (BBS) at 603-924-3181. All programs featured in "Shareware Exchange" are available electronically from the *DOS World* BBS (instructions on page 80). RIPTerm (RIPTM1.ZIP) is in File Area 3. ArcMaster (AM105.EXE), DocSmash (DOCSMASH.ZIP), LASR_MAN (LASMAN.ZIP), and PowerBatch (PWRBAT.EXE) are in File Area 5. In addition, most of the programs described in "Shareware Exchange" can be found on major on-line services and local BBSes.

—Eds.

and freeware file-compression utility, as well as with two popular antivirus programs. If you like to keep your files organized in compressed archives, or if you often download files from BBSes and information services, ArcMaster is an excellent utility. It will help you manage your archives, see what's inside, and move files into and out of archives with no hassle.

Plus, if you want a full DOS shell that will help you navigate through subdirectories, show you the files in two directories at the same time, and let you move files from one location to another easily, you'll find ArcMaster a top-notch utility. Consider it if you often want to see what a file contains, if you want a simple and powerful text editor, or if you want a shell that supports NDOS and 4DOS.

The only criticism I have is the steepness of the program's learning curve: Because it does so much, it takes a while to master. Its seven pull-down menus contain 84 separate commands. You'll want to start learning the Ctrl and Alt key combinations that make ArcMaster work without menus.

But don't be intimidated. As long as you set the program up correctly, you can experiment without worry. The only crucial part is to define a working directory you'll reserve for the program. Don't use the directory that holds ArcMaster itself, and don't use your \TEMP directory. ArcMaster needs one directory with which it can work, one that no other program will use. Once you've created that directory and told ArcMaster where it is, the program is fun to explore. You can copy files from one directory to another easily, keeping your compressed files up to date, and generally enjoying your computer more. Eventually, you'll even learn all those fast keys.

Turn Your Printer Green

The final nomination this month is from Robert J. Batterberry of Mt. Vernon, Washington:

> ***DocSmash** is a terrific shareware utility that prints multiple pages on a single sheet of paper. I've tried several printing utilities, and I prefer DocSmash for its simplicity and functionality.*

First, if you don't have a print-compression utility, you need one. When you print downloaded programs' manuals, print copies of important files, and print your e-mail, you're probably wasting paper. By default, DocSmash prints four pages per sheet.

DocSmash was last updated in March 1991, when laser printers were expensive and Epson-compatible dot-matrix printers were the norm. The program offers support for the HP LaserJet II and HP DeskJet, but not for other dot-matrix and laser models. I had difficulty using DocSmash with my LaserJet III. I also had a hard time changing the DocSmash printer-configuration file to work with my printer. I gave up because I've found a much better program, at least for laser and ink-jet printers. **LASR_MAN** prints 1, 2, 4, 8, or 16 pages per sheet. It can add headers and footers, print in portrait or landscape, leave room for binding on the edge, and add a half-tone rubber stamp (such as "Do Not Duplicate") over each page. The list goes on and on.

LASR_MAN's screen and menus are a little jumbled, but it really isn't difficult to use. It offers built-in support for LaserJet and DeskJet printers, but it's easy to configure for most other laser and ink-jet printers. It costs a little more than DocSmash, but it does much more. You can't use LASR_MAN with most dot-matrix printers, but it's a welcome addition to my library of laser-printer tools. ■

Technical Editor Hardin Brothers has been working with computers and writing about them for 15 years.

PRODUCT INFORMATION

ArcMaster 10.5, $35
New-Ware
8050 Camino Kiosco
San Diego, CA 92122-1820
619-455-6225 voice
619-450-3257 BBS

DocSmash 3.31, $12.50
David Rettger
5304 Johnson Avenue
Western Springs, IL 60558

LASR_MAN 6.05, $40
MicroMetric
98 Dade Avenue
Sarasota, FL 34232
800-929-0184
813-377-2515

PowerBatch 2.2, $30
PB Plus+, $45
CSD, Inc.
4437 Ormond Trace
Marietta, GA 30066

RIPTerm 1.54.00, freeware
RIPTerm 2.0, $10
TeleGrafix Communications, Inc.
16458 Bolsa Chica #15
Huntington Beach, CA 92649
714-379-2131 voice
714-379-2132 fax
714-379-2133 data

CUSTOMIZING YOUR START-UP

My AUTOEXEC, My Self

Your AUTOEXEC.BAT file is a reflection of your computing style, creativity, and organizational skills. It's also a pretty fair gauge of how well you know DOS.

by Dan Gookin

Just as no two computer systems are alike, no two AUTOEXEC.BAT or CONFIG.SYS files are exactly the same. Each one is customized to your computer, its hardware and software, and your personality. In a sense, your AUTOEXEC.BAT file is a reflection of yourself.

AUTOEXEC.BAT Basics

In the grand scheme of things, AUTOEXEC.BAT and its twin sister CONFIG.SYS will go down in history with Thunder and Lightning, Plague and Pestilence, and Death and Taxes as two words designed to instill woe into those who utter them. Even Apple Computer uses the mere threat of an AUTOEXEC.BAT file to lure customers into buying a Macintosh. After all, only ugly DOS has such a blemish.

However ugly, both CONFIG.SYS and AUTOEXEC.BAT play important roles in getting your computer system underway. CONFIG.SYS has two jobs: Setting aside memory that DOS uses when dealing with your disk drives, and loading specialty programs called device drivers. AUTOEXEC.BAT is a batch file, and doesn't come into play until way after the whole of DOS is in memory and ready to go.

Actually, AUTOEXEC.BAT is optional. Without it, your PC will start just fine: You might see prompts asking for the current date and time, then the DOS copyright notice and a lonely-looking command prompt. But with a proper AUTOEXEC.BAT file, you can save yourself a lot of the typing that would follow such a bland bootup. (See the accompanying sidebars for a look at how the "experts" use AUTOEXEC.BAT to automate their computing sessions.)

For example, suppose every day when you start your computer the first thing you type at the DOS prompt is SCHED to see who'll be bugging you today. Why bother typing that? Instead, stick it into your AUTOEXEC.BAT file and have the computer run your scheduling program for you automatically. That's the idea behind the commands in AUTOEXEC.BAT. They configure the DOS prompt and other minor things, but most importantly, they run programs you'd otherwise have to start up manually.

The Guts of AUTOEXEC.BAT

Up front, AUTOEXEC.BAT is a batch file, a special type of text file that contains row upon row of DOS commands, program names, or just about anything you'd normally type at the command prompt. You can also toss in special batch-file commands, though that's rarely done in AUTOEXEC.BAT. The object is to fill AUTOEXEC.BAT with commands you'd normally type every time you turn on your system, plus a few other goodies that may make your computing day more livable.

What you type and the names of programs you run are as individual as you are. From AUTOEXEC.BAT, you can do any or all of the following:

- configure the command prompt
- create environment variables
- set the DOS search path
- configure the display, keyboard, and printer
- load startup TSRs and device drivers

Contributing Editor Dan Gookin is the author of numerous books on computing, including the best-selling DOS for Dummies *(IDG Books).*

A BATCH OF UTILITIES

My AUTOEXEC.BAT file relies heavily on several utility programs. First, I use STACKER to compress my hard drives. I use an older version, STACKER 3.10, to make the drives readable by both DOS and OS/2. Lines 3–5 run a STACKER program that verifies that the compressed drives have been correctly identified and opened.

Second, I use a shareware program called BOOT.SYS to create complex menus in my CONFIG.SYS file. Lines 7–13 of my AUTOEXEC.BAT file detect the configuration I've chosen during CONFIG.SYS processing. Lines 12 and 13, in particular, jump to the correct portion of AUTOEXEC.BAT based on the choices I made in CONFIG.SYS.

I've shown two of my many configurations in the rest of the sample AUTOEXEC.BAT file. I use lines 15–18 when I want to boot up with a plain-vanilla configuration.

Lines 20–47 are for my day-to-day configuration. They begin by calling another batch file, QEMMBAT.BAT, which in turn loads SHARE.EXE, MOUSE.COM, and a disk cache; increases the number of files DOS can open; increases the LASTDRIVE setting to drive Z; and loads a few other TSRs (memory-resident utilities). I perform all these actions with QEMM to leave free as much DOS memory as possible. (I have other configurations that perform similar tricks with DOS's memory-management programs and with 386MAX.)

Line 23 sets my prompt, which displays the time and date on one line, and the current drive and directory on a second line, using the expression $_ to start the new line.

Lines 24, 25, and 26 depend on 4DOS from JP Software, a shareware replacement for COMMAND.COM. (Symantec's NDOS, which is included in The Norton Utilities, is based on an early version of 4DOS.) 4DOS uses less memory below 640K than COMMAND.COM, offers dozens of new and enhanced commands, and adds an incredible amount of power to batch files.

Line 24 loads the environment. I need a relatively large environment, which the SET /R command reads from disk instead of calling multiple SET commands to set each string. Line 25 sets several dozen 4DOS aliases (similar to DOSKEY macros), and finally, line 26 loads the command history I use when I start my computer. With the command history, I can select from a pop-up list of common commands instead of typing them from scratch.

In lines 31–38 I take advantage of another feature of BOOT.SYS to run Norton Disk Doctor each day on my hard drives. Lines 31 and 32 check to see how long it's been since the last test, and, if it's been more than a day, asks whether I want to perform one now. Unless I say no within ten seconds, line 34 begins a series of tests with Norton Disk Doctor.

Finally, I use a few SUBST commands to set up logical drives. SUBST assigns a new drive letter to a subdirectory (and all directories below it) to organize a large hard disk. Then the batch file exits to DOS, and I'm ready to start working.

—Hardin Brothers

```
 1 @ECHO OFF
 2
 3 REM The "CHECK" line below provides
   additional safety
 4 REM for STACKER drives. Please do not
   remove it.
 5 C:\STACKER\CHECK /WP
 6
 7 C:\BOOT\BOOT.EXE SET
 8 REM BOOT.SYS: Do NOT remove the command
   above--
 9 REM it is required for proper operation
   of BOOT.SYS!
10
11 IF ERRORLEVEL 1 GOTO NOT_INSTALLED
12 GOTO %BOOT%
13 GOTO NOT_INSTALLED
14
15 :PLAIN
16 PATH C:\DOS;D:\WINDOWS;D:\BIN;D:\BATCH
17 PROMPT $P$G
18 GOTO QUIT
19
20 :NORMAL
21 @ECHO OFF
22 CALL QEMMBAT.BAT
23 PROMPT=$_     $T :: $D$_$P $Q$Q$G
24 SET     /R NORM_ENV.ASC
25 ALIAS   /R NORM_ALS.ASC
26 HISTORY /R NORM_HST.ASC
27 IFF %@LPT[1]==0 THEN
28 BEEP ^ PAUSE TURN ON THE PRINTER!
29 ENDIFF
30
31 C:\BOOT\BOOT OnceADay C:\BOOT\DAYTEST ?10Y
   DISK CHECK
32 IF NOT ERRORLEVEL 3 GOTO NO_NU
33
34 D:\NU\NDD C:/Q
35 D:\NU\NDD D:/Q
36 D:\NU\IMAGE C:
37 D:\NU\IMAGE D:
38 D:\NU\IMAGE E:
39
40 :NO_NU
41 CLS
42
43 C:\DOS\SUBST F: D:\D3
44 C:\DOS\SUBST G: D:\D4
45 C:\DOS\SUBST H: D:\EXTRA
46
47 GOTO QUIT
48
49 REM -- other configurations here ...
50
51 :NOT_INSTALLED
52 ECHO BOOT.SYS IS NOT INSTALLED PROPERLY.
53
54 :QUIT
```

End

- set up your network
- run appointment-book application software
- run your first program of the day, a menu system, or a shell

None of these tasks is crucial. Of all of them, I'd say one of the most important items to set in AUTOEXEC.BAT is the DOS search path—a list of directories DOS shuffles through, looking for programs to run.

Whenever you enter something at the prompt, DOS checks first to see whether it's an internal command (such as COPY, DIR, or REN). If it isn't, DOS looks in the current directory for a COM, EXE, or BAT file with that name. If it comes up empty, DOS then checks the search path—a list of subdirectories stored in memory in DOS's environment.

DOS checks each directory for a COM, EXE, or BAT file whose name matches what you typed. If nothing turns up, you see the infamous "Bad command or file name" error message.

You set a path by listing a directory's pathname after the PATH command. For example:

```
PATH C:\DOS;C:\UTIL;C:\WP
```

Putting this command line early on in your AUTOEXEC.BAT file means that DOS will hunt down files in your C:\DOS, C:\UTIL, and C:\WP directories without your having to do any additional typing. (Supposedly those directories contain a lot of popular commands and batch files you use every day.)

Further, by putting that command early on in AUTOEXEC.BAT, you remove the need to type in full pathnames for the commands your system uses in AUTOEXEC.BAT. So the following sequence:

```
C:\DOS\DOSKEY /INSERT
C:\DOS\SMARTDRV
C:\UTIL\SCHED
```

becomes this:

```
DOSKEY /INSERT
SMARTDRV
SCHED
```

Again, you save typing.

Stupid Memory Tricks

Basic DOS memory management (what there is of it) is really done in your CONFIG.SYS file, not AUTOEXEC.BAT. That's where various device drivers are loaded and DOS itself is ordered into high memory or sentenced to lurk down in low memory. If you have a decent memory manager, such as QEMM, 386MAX, or even MS-DOS 6.x, you'll probably use a memory-configuration command that takes care of all those details for you.

What's left over for memory management in AUTOEXEC.BAT is simply loading memory-resident programs (TSRs) into upper memory. That's accomplished by some type of "load high" command, either DOS's LOADHIGH or the specific load-high command for your memory manager. For example, in Robert Hummel's AUTOEXEC.BAT you find the following line:

```
LH C:\UT\DOSKEY
```

Above, memory-management software will attempt to place the DOSKEY program into upper memory using the LOADHIGH command (abbreviated here as LH). If it fits there, great. Otherwise the program will be loaded into lower memory.

Some of these load-high commands can look quite complex in your AUTOEXEC.BAT. Don't fret. Typically that means that some memory optimizer has set things up, tuning and tweaking to get it all just right.

Another important thing done in AUTOEXEC.BAT is setting up a disk cache. A cache is memory set aside to speed something up, and one of the slowest things in your computer is the hard drive. So a disk cache is basically a control program that uses a sliver of memory to give you a faster hard drive. This type of program typically finds its way into your AUTOEXEC.BAT file.

The most popular disk cache (probably because it comes free with both MS-DOS and Windows) is Microsoft's SmartDrive. It used to be set up in CONFIG.SYS, but recently changed lodgings to AUTOEXEC.BAT. You may find it nestled there as follows:

```
C:\WINDOWS\SMARTDRV /X
```

A number of options may follow SmartDrive. Currently, /X is the most popular because it turns off write caching, which proved bothersome to certain disk-compression programs. Otherwise you might see SmartDrive followed by a parade of drive letters or memory options. For example, Doug Lowe's AUTOEXEC.BAT includes the following line:

```
LH C:\DOS\SMARTDRV.EXE 4096 1024
```

The numbers tell SmartDrive to set up a disk cache of 4MB under DOS and at least 1MB under Windows. The current version of SmartDrive is 5.0. With it you no longer need to specify the disk-cache memory size; it makes a good guess based on how much free memory your PC has.

One big issue with disk caching is getting it to cache your CD-ROM drive, which can greatly speed up CD software. To make this happen you must specify the Microsoft CD-ROM extension driver before your disk cache in AUTOEXEC.BAT. Again, referring to Doug Lowe's AUTOEXEC.BAT file, you see how it's properly done:

```
LH C:\DOS\MSCDEX.EXE /S /D:MSCD001
  /L:E
LH C:\DOS\SMARTDRV.EXE 4096 1024
```

By running the MSCDEX.EXE program first, Doug has made his system aware of the CD-ROM drive—

EVERYTHING IN ITS PLACE

My computers are in a constant state of flux. I'm always installing new software, removing old software, or just plain rearranging things. Inevitably, these changes affect my AUTOEXEC.BAT file. To make my life easier, I organize my AUTOEXEC.BAT file for maximum clarity. For me, that boils down to the following three rules:

- Group the commands in the file into sections according to function.
- Use plenty of comments.
- Use environment variables to simplify complex statements and make modifications easier.

My AUTOEXEC.BAT file is divided into sections. All commands and programs that perform similar functions appear in one group. This makes temporary modifications—such as disabling all memory-resident programs—easier.

Each section begins with a block of comments describing what tasks are being performed by the commands that follow. You simply can't have too many comments. I use comments to remind me what a particular command or utility does. Even better, I usually include the command-line syntax for complicated commands such as SMARTDRV—it sure beats searching for my DOS manual when I need to make a change.

Instead of the usual REM command, I use the colon (:) character to create comments. That makes my AUTOEXEC.BAT file look neater. It also has another tangible benefit: It speeds up processing. As DOS reads through a batch file, it automatically skips over any line whose first character is a colon; DOS has to read at least four characters to identify a REM command.

Of course, there's a downside. All those comments require periodic maintenance—the only thing more frustrating than having no comments in your AUTOEXEC.BAT file is having incorrect ones. Despite that drawback, I find that good organization and clear documentation help me keep my AUTOEXEC.BAT file under control.

—Robert L. Hummel

```
:-------------------------
: PC-DOS 6.3
: Upper/High Memory management
:-------------------------
@ECHO OFF

:-------------------------
: Set configuration options
: to speed up normal operation

BREAK OFF
VERIFY OFF

:-------------------------
: Load TSRs first
: SMARTDRV /X=don't cache disk writes
:          /U=don't cache CD-ROMs
:-------------------------
LH C:\UT\DOSKEY
LH C:\UT\SMARTDRV /X /U
```

```
:-------------------------
: Set environment variables
: Use R1 to represent RAMdisk
: Use P to hold primary path
: Point temporaries to RAMdisk
:-------------------------
SET OS=PC-DOS 6.1
SET R1=J:

SET P=%R1%;C:\DOS;C:\UT;C:\BAT;
    D:\WP;E:\ASM
SET PATH=%P%

SET TMP=%R1%\
SET TEMP=%R1%\
SET PROMPT=[$P]

:-------------------------
: Copy commonly used batch files
: and utilities to the RAMdisk.
: Redirect the output of COPY to
: NUL to avoid screen clutter.
```

```
:-------------------------
COPY C:\BAT\*.BAT    %R1% >NUL
COPY C:\UT\DDIR.COM %R1% >NUL
COPY D:\WPLIB\PE*.* %R1% >NUL
COPY D:\WPLIB\*.PEM %R1% >NUL

:-------------------------
: Copy COMMAND to RAMdisk
: Tell DOS where to find it
:-------------------------
COPY C:\COMMAND.COM %R1% >NUL
SET COMSPEC=%R1%\COMMAND.COM

:-------------------------
: Run transient utilities
: 40       : Set screen to 40 lines
: BORDER   : Set border color
: TURBOKEY: Speed up Keyboard
: TD        Display time/date
: PROMPT   : [C:\]
:-------------------------
C:\UT\40
C:\UT\BORDER 10
C:\UT\TURBOKEY A 1>NUL
C:\UT\TD
```

End

even giving it a drive letter, E (the /L:E option). When SmartDrive runs in the next line, it seeks out and recognizes the CD-ROM drive, caching it and helping it run faster.

Fun with AUTOEXEC.BAT

AUTOEXEC.BAT doesn't have to be all commands and saved keystrokes. You can have some fun with it as well. Most people do that with their command prompt, sprucing it up with some ANSI commands or fancy characters. Others may use colorful text, again with ANSI commands, in their AUTOEXEC.BAT files.

I make my personal AUTOEXEC.BAT file fun by displaying a graphics image and playing a sound file when my computer starts. A utility named VPIC displays the image; the PLAYFILE command that came with my sound card plays the sound. I could also use a "talker" utility to have my computer's sound card read my AUTOEXEC.BAT, but that takes a long, long time and tends to get annoying after a while.

The idea behind adding some fun commands to your AUTOEXEC.BAT file is that it breaks up the monotony of long, boring copyright notices. Unfortunately, it can get tedious, especially when you have to reboot your computer several times a day. Because of that, I've limited myself to one "cookie"; the sound card proudly announces—in a *Mission Impossible* voice—that "this disk will self-destruct in five seconds."

Don't Boot Me This Way

While there are no hard and fast rules for constructing your AUTOEXEC.BAT file, there are some tacky things you should avoid doing. For instance, it's just plain sloppy to put several copies of one command into your AUTOEXEC.BAT. This happens a lot with beginners. They may have an AUTOEXEC.BAT file with several copies of the SmartDrive command, for example. Who knows how they got there? But the duplication is unnecessary and only serves to waste time while the computer starts. There are exceptions to the once-only command rule; these apply to disk optimizers or to commands that may operate on several hard drives or have varying options after them.

Don't forget to include an @ECHO OFF command at the very beginning of AUTOEXEC.BAT. This prevents the commands themselves from being displayed as AUTOEXEC.BAT runs. A few installation programs may make modifications to AUTOEXEC.BAT, sticking their commands in front of the @ECHO OFF. When this happens, edit AUTOEXEC.BAT and move the commands to just below the first line. Some beginners don't bother, so their AUTOEXEC.BAT files look junky on screen.

Finishing Up

Finally, the only other tricks worth having are those that make AUTOEXEC.BAT run more smoothly. Utilities to make that so abound in the back of batch-file books and can be found on line. For example, the ALTPAUSE utility shown in Ken Johnson's AUTOEXEC.BAT file is

THE KEY TO WINDOWS

There's nothing too elaborate about my AUTOEXEC.BAT file. The SET BLASTER and SBP-SET commands are required to support my Sound Blaster card. The SET READIBM . . . command and the inclusion of C:\READIBM in the PATH command are necessary because I frequently use an IBM program that lets me access documentation for IBM software systems stored on CD-ROM. And I use the PROMODE command to enable my video monitor to operate in high resolution under Windows.

The only genuinely peculiar thing about my AUTOEXEC.BAT file is the last two lines:

```
C:\UTIL\KEYSTATE
IF NOT ERRORLEVEL 1 WIN
```

KEYSTATE is a handy little program that sets ERRORLEVEL to indicate whether the Shift, Alt, or Ctrl key has been pressed. The IF command will run Windows if ERRORLEVEL is 0 (zero)—that is, if none of the aforementioned keys was pressed. That lets me skip Windows simply by holding down any of those three keys while my AUTOEXEC.BAT is running.

To create the KEYSTATE.COM program, use the DOS EDIT command to create a text file named KEYSTATE.SCR containing the following lines:

```
A 100
MOV AH,02
INT 16
AND AL,0F
MOV AH,4C
INT 21

N KEYSTATE.COM
RCX
A
W
Q
```

Don't forget to leave the blank line between INT 21 and N KEYSTATE.COM. Then, at the DOS prompt, type this command:

```
DEBUG <KEYSTATE.SCR
```

That creates a small program file named KEYSTATE.COM. You can then include KEYSTATE in a batch file such as AUTOEXEC.BAT. Thereafter, if the Shift, Ctrl, or Alt key is pressed when the user types in that command, KEYSTATE sets ERRORLEVEL to 1 or greater. If none of these keys is pressed, ERRORLEVEL is set to 0 (zero).

—Doug Lowe

```
@ECHO OFF
SET BLASTER=A220 I2 D1 T4
SET READIBM=C:\READIBM\READIBM.PRO
SET TEMP=C:\TEMP
PROMPT $P$G
PATH C:\DOS;C:\UTIL;C:\EXCEL;C:\WINWORD;C:\WINDOWS;C:\READIBM
C:\SSPRO\UTIL\PROMODE MONITOR
C:\SBPRO\SBP-SET /M:12 /VOC:12 /CD:12 /FM:12
LH C:\DOS\MSCDEX.EXE /S /D:MSCD001 /L:E
LH C:\DOS\SMARTDRV.EXE 4096 1024
LH C:\DOS\SHARE.EXE /L:500 /F:5100
LH C:\DOS\MOUSE
C:\UTIL\KEYSTATE
IF NOT ERRORLEVEL 1 WIN
```

End

handy because it lets you pause the screen to see that occasional fleeting "Error" message.

If there's anything you regularly type when you start up your computer, you should place it in AUTOEXEC.BAT as one of the last commands. This is something many users neglect, but it's a definite advantage worth taking. For example, suppose you always run the DOS Shell after your system starts. Why not make DOSSHELL the last command in AUTOEXEC.BAT?

The same holds true for other shell programs, menu systems, and even Windows. The idea behind a strong AUTOEXEC.BAT file is to take care of all your PC's start-up business. In fact, if the first thing you do is run WordPerfect, you can always add WP as the last line in AUTOEXEC.BAT. That might save you only three keystrokes (`WP` plus Enter), but over several weeks of using your PC those keystrokes add up.

THE QUESTION IS BOOT

My AUTOEXEC.BAT is set up to work with an MS-DOS MultiConfig menu in my CONFIG.SYS file. The MultiConfig menu, added in MS-DOS 6.0, is a startup menu that lets you select different configurations each time you boot your PC. It's handy if you use your computer in distinct ways at different times, which I often do as a writer and instructor.

When I start my computer, the CONFIG.SYS MultiConfig menu displays three options: a QEMM boot, an MS-DOS 6.2 boot, and a minimum boot. That's a result of the following commands in my CONFIG.SYS:

```
[MENU]
MENUITEM=QEMM,QEMM386 Boot
MENUITEM=MSDOS6,MS-DOS 6.2 Boot with Windows
MENUITEM=MINIMUM,Plain Vanilla Boot
MENUCOLOR=15
MENUDEFAULT=QEMM,5
```

Within the menu block I set the menu color (15 is bright white on black), and indicate the default menu selection—the QEMM boot, which DOS selects automatically after five seconds if the user doesn't choose.

CONFIG.SYS contains a configuration block for each menu selection. The block begins with the configuration name in square brackets (the name on the MENUITEM= line). Each configuration block lists the CONFIG.SYS commands to execute for that selection. For example, here's the configuration block for my QEMM boot:

```
[MSDOS6]
DEVICE=C:\DOS\HIMEM.SYS /V
DEVICE=C:\DOS\EMM386.EXE RAM HIGHSCAN X=A000-C7FF
  WIN=DD00-DFFF
BUFFERS=40,0
FILES=60
DOS=UMB
LASTDRIVE=H
FCBS=4,0
DOS=HIGH
BREAK=ON
STACKS=17,256
SHELL=C:\DOS\COMMAND.COM C:\DOS\ /E:512 /p /f
DEVICEHIGH /L:1,12048 =C:\DOS\SETVER.EXE
DEVICEHIGH /L:1,9072 =C:\DOS\ANSI.SYS /X
DEVICEHIGH /L:1,40208 =C:\STACKER\STACHIGH.SYS
```

When you choose a menu item from a CONFIG.SYS menu, DOS creates a CONFIG environment variable containing the name of the selected configuration block.

To associate particular commands in AUTOEXEC.BAT with the chosen configuration, you create labels with each configuration block name.

Following the label are the commands for that selection. Placing a GOTO %CONFIG% statement at the beginning of AUTOEXEC.BAT will branch to the specific label and so execute those commands.

My default configuration uses QEMM 7.5 as the memory manager and PC-Kwik as a disk cache. But sometimes for writing or testing I want to go "all DOS" and use DOS's own HIMEM and EMM386 for memory management and SmartDrive as the cache. That's my MSDOS6 selection.

My MINIMUM configuration loads only the basic programs, so it's faster to boot up than the other two choices. I use MINIMUM when I want to get on my PC quickly and do something simple, such as copy a file to a floppy.

Both the QEMM and MSDOS6 configurations have been optimized for memory usage with QEMM's Optimize program and DOS's MemMaker, respectively. Optimize puts in the LOADHI statements; /R: refers to the memory region created by QEMM where the driver or program is loaded.

MemMaker puts in the DEVICEHIGH and LH (that is, LOADHIGH) statements for the MSDOS6 configuration. /L: shows the memory region for the driver or program; the number following is the minimum size required in the region when the program is running.

You'll notice that after almost each executable line in AUTOEXEC.BAT I run a program called ALTPAUSE—a little utility that will stop the execution of a batch file when the user presses the Alt or Ctrl key (and for as long as he or she presses it). This lets me stop and read messages—including error messages—from the booting programs.

The :END of the file contains the common items for all configurations. There are two CALLs to other batch files. DKMACROS.BAT contains my DOSKEY macro definitions; SETSET.BAT contains all my SET statements. Having these commands in separate files simplifies keeping track of them and editing them.

Of course, an opposite problem is created when you do this: Suppose every time you start your PC it runs something dreadful—such as Windows! If so—and it's not what you want (you always find yourself quitting Windows to return to DOS)—you should remove that line from your AUTOEXEC.BAT file. Just delete the offending line, and save it back to disk. The next time you start your computer, the stinky program won't run.

Be Your Own Judge

Because every computer—and every computer user—is different, there's no one perfect AUTOEXEC.BAT file. There's only a perfect AUTOEXEC.BAT file for your own computer and your own tastes. Whether yours is neat and tidy or cluttered, colorful or bare-boned, keep in mind that the reason you have a computer is to get work done (okay, or to have fun). Your AUTOEXEC.BAT should start you on your way. ■

The two IF NOT EXIST statements help clean up unnecessary files. I use D:\JUNK as a temporary holding area for things like unzipped files before I move them to their proper directories, and short batch files for one-time use. Typically I don't want to keep these files when I restart my computer. Just in case I do, though, the CHOICE command asks me whether to delete them—the default being yes.

I also delete any remaining files in the Windows TEMP directory, cleaning up in case of a Windows reboot.

—Ken Johnson

```
@ECHO OFF
C:\UTIL\ALTPAUSE
C:\STACKER\CHECK /WP
GOTO %CONFIG%

:QEMM
C:\SSPRO\UTIL\PROMODE MONITOR
     C:\UTIL\ALTPAUSE
D:\PCTOOLS\BOOTSAFE
     C:\UTIL\ALTPAUSE
PROMPT $P--$G
PATH=C:\QEMM;C:\DOS;C:\;C:\STACKER;C:\WINDOWS;
C:\WINMAST;C:\PCKWIK;C:\UTIL;D:\NU;C:\ZIP
     ALTPAUSE
C:\QEMM\LOADHI /R:1 C:\WINDOWS\MOUSE
     ALTPAUSE
C:\DOS\DOSKEY /BUFSIZE=1024 /INSERT
     ALTPAUSE
C:\QEMM\LOADHI /R:1 /LO C:\PCKWIK\SUPER
ConfigFile=C:\PCKWIK\PCKWIK.INI
     ALTPAUSE
C:\QEMM\LOADHI /R:1 C:\PCACHE\PCACHE
     ALTPAUSE
GOTO END

:MSDOS6
C:\SSPRO\UTIL\PROMODE MONITOR
     C:\UTIL\ALTPAUSE
D:\PCTOOLS\BOOTSAFE
     C:\UTIL\ALTPAUSE
PROMPT $P--$G
PATH C:\DOS;C:\;C:\STACKER;C:\WINDOWS;
C:\WINMAST;C:\UTIL;D:\NU;C:\ZIP
LH /L:0;1,45472 /S C:\DOS\SMARTDRV.EXE /V C F E
     ALTPAUSE
C:\WINDOWS\MOUSE
     ALTPAUSE
C:\PCACHE\PCACHE
     ALTPAUSE
LH /L:1,6384 C:\DOS\DOSKEY /BUFSIZE=1024 /INSERT
     ALTPAUSE
GOTO END

:MINIMUM
C:\SSPRO\UTIL\PROMODE MONITOR
     C:\UTIL\ALTPAUSE
PROMPT $P--$G
PATH C:\DOS;C:\;C:\STACKER;C:\WINDOWS;
C:\WINMAST;C:\UTIL;D:\NU;C:\ZIP
C:\WINDOWS\MOUSE
C:\DOS\DOSKEY /BUFSIZE=1024 /INSERT
GOTO END

:END
:: COMMON STUFF - load DOSKEY macros
& SET statements
CALL DKMACROS
CALL SETSET

IF NOT EXIST D:\JUNK\*.* GOTO TEMPDEL
CHOICE /C:YN /T:Y,10 "Delete Temp Files? "
IF ERRORLEVEL 2 GOTO TEMPDEL
ECHO Y | DEL D:\JUNK\*.*

:TEMPDEL
IF NOT EXIST C:\WINDOWS\TEMP\*.* GOTO DOWIN
ECHO Y | DEL C:\WINDOWS\TEMP\*.*

:DOWIN
IF NOT "%CONFIG%"=="MSDOS6" GOTO FINAL
ECHO.
ECHO.
CHOICE /C:YN /T:Y,5 "Load Windows? "
IF ERRORLEVEL 2 GOTO FINAL
WIN

:FINAL
CLS
```

End

USING COMMAND SWITCHES

Become a DOS Switch Hitter

Take some pointers from an old pro, and learn how DOS command switches can make you more productive right off the bat.

by Ken Johnson

Understanding DOS's command switches and using them appropriately is the way to become a DOS power user. Without switches, a DOS command can perform only one action. With them, you can boost your productivity at the command line by making DOS commands perform the specific tasks you want. Switch hitters drive DOS much farther.

A switch selects a particular option for a command and tells it how to act. Its syntax is relatively straightforward. Each switch begins with a slash (/), followed by a letter or word. For example, the DOS command XCOPY, by itself, copies one or more files. But with its set of switches, you can make the command copy only files that have been modified (XCOPY /A and XCOPY /M), copy files created or modified after a specified date (/D), ask permission to copy a file (/P), copy subdirectories and their files (/S), copy empty subdirectories (/E), verify the copy (/V), overwrite files without warning (/Y), or ask for confirmation before overwriting files (/-Y).

To this simple formula, you can add parameters—command-line variables that tell a DOS command on which subject to act. In the following statement, for example, the file specification tells EDIT which file to open:

```
EDIT /B AUTOEXEC.BAT
```

/B is the switch that tells the EDIT program to run in black-and-white mode. AUTOEXEC.BAT is a parameter telling EDIT which file to load for editing. Parameters are always changing, but each DOS command offers a constant set of switches available for your use. Unfortunately, that may be the only thing constant about switches.

/Which /Switch?

Most DOS commands use single-letter switches; starting with MS-DOS 6.0, however, Microsoft began using words (and their abbreviations) for switches. Compare the XCOPY switches listed above to some for DoubleSpace (/CHKDSK, /COMPRESS, /LIST, for example) and ScanDisk (/ALL, /CUSTOM, /MONO). Spelling out switch names instead of using single letters makes them more understandable and is in line with how Microsoft Windows sets options in its INI files.

Still, since most switches consist of single letters, it's easy to become confused about their specific functions. To make matters worse, Microsoft has never made switches consistent among commands, or even within the same command.

Consider the /P switch, for example. Does it have something to do with *p*rinting? Yes, with PRINT and UNFORMAT. Does it mean *p*ause after each screen of data? Yes, with the commands DIR and MEM in MS-DOS 6.x. Could it *p*rompt you for something? Yes, in DEL, ERASE, REPLACE, RESTORE, and XCOPY. But then again it can also show *p*rograms in memory (with the command MEM in MS-DOS 5) and run a *p*rogram in nongraphic, command-line mode (MSAV).

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Switch use isn't consistent even within the same command. MEM is a prime example. In MS-DOS 5, the command MEM /P shows the memory your *p*rograms are using. But in 6.0, the same command *p*auses the display of information after each screen—just as DIR does with /P.

The /F switch combined with the DBLSPACE command also means different things, depending on the other switches it accompanies. DBLSPACE /F *f*ormats the compressed drive. DBLSPACE /CHKDSK /F in MS-DOS 6.0 *f*ixes errors on a compressed drive. But the command DBLSPACE /DEFRAGMENT /F (in MS-DOS 6.2) more *f*ully defragments the compressed drive. And DBLSPACE /COMPRESS /F suppresses the *f*inal report after compression is complete.

And while we're on the /F switch, let's not forget its other meanings.

BEWARE THE OLD SWITCHEROO

Although a DOS command and its switch can be a winning combination, some switches can cause disastrous results when used incorrectly—or without understanding their purpose. Among the more "dangerous" switches are these:

- **COPY /A:** The /A switch specifies an ASCII copy, and DOS assumes that Ctrl+Z indicates the end of the file's data. Use this switch only for text files. Typically, a COM or EXE program contains several Ctrl+Z characters, which will stop the copy—leaving an incomplete (and unexecutable) copy of the original.

- **SMARTDRV /C** (initial command) and **SMARTDRV /S** (initial command): SMARTDRV's /C switch writes the cache to disk; the /S switch displays information about the cache. Both are used after SMARTDRV is running. If you use them on the initial SMARTDRV command, SMARTDRV won't load.

- **DRIVPARM /C:** DRIVPARM defines parameters for an existing physical drive, usually a floppy drive. The /C switch (change-line support) indicates that the floppy drive can detect when the door is open, meaning DOS doesn't have to check the disk when accessing it. If you use the /C switch and the drive doesn't have change-line support, DOS may overwrite data, because it doesn't know the disk has been changed.

- **DBLSPACE /DOUBLEGUARD=0:** This (rather lengthy) switch in MS-DOS 6.2 disables DoubleGuard. DoubleGuard checks DoubleSpace's memory buffers for corruption and prevents corrupt data from being written to the compressed disk. Although DoubleGuard imposes a small performance penalty, turning it off could result in damage to your compressed files.

- **CHKDSK /F:** CHKDSK requires the /F switch to fix errors in the FAT (file-allocation table) and directory structure of the disk. Never use CHKDSK /F when files are open, however, because it can corrupt those files. Don't run it from another program (such as shelling out to DOS from your word processor) or from DOSSHELL or Microsoft Windows.

- **DBLSPACE /FORMAT:** This switch (abbreviated as /FOR) formats the specified compressed drive. All files are deleted, and you can't unformat the drive.

- **DEFRAG /H:** This switch lets the DOS utility move hidden files when reorganizing files on the disk. Some programs use their hidden files in a copy-protection scheme; if they're moved, the program won't run. Other programs search for hidden files in a specific location on the disk, and if they aren't there, problems may occur. Examples include the MS-DOS 5 MIRROR program's MIRROR.FIL, and 386SPART.PAR, the Windows permanent swap file. For safety's sake, don't move hidden files.

- **SMARTDRV /N:** In MS-DOS 6.2, the /N switch instructs SMARTDRV to perform write caching. SMARTDRV doesn't write cached data when a command finishes, but waits until system resources are free to write to disk. Although that improves performance, it comes with a potential danger: If the computer freezes or you shut it off before the data in the cache is written back to the disk, the data will be lost. Also, if the cache is writing and updating the disk's system areas or a DoubleSpace compressed disk when the computer shuts down, other data on the disk can be corrupted. When using /N with SMARTDRV, make sure to flush the cache with the command SMARTDRV /C before turning off your PC.

- **FORMAT /U:** /U does an unconditional format of the disk. You can't use the command UNFORMAT to recover existing data.

- **DELTREE /Y:** DELTREE with the /Y switch deletes subdirectories and files without prompting you first for confirmation.

- **COPY /Y, XCOPY /Y, MOVE /Y:** In MS-DOS 6.2, when entered from the command line, COPY, XCOPY, and MOVE automatically ask for confirmation to overwrite destination files. The /Y switch overwrites without warning, just as the commands themselves do in previous DOS versions. You can make overwriting files the default by setting the COPYCMD environment variable to /Y.

—K.J.

/F with MEM shows *f*ree memory, /F with MSAV turns off the display of *f*iles being scanned, /F with TREE includes the display of *f*ilenames, /F with CHKDSK *f*ixes errors, /F with DEFRAG moves *f*ree space to the back of the disk, and /F with SMARTDRV in MS-DOS 6.2 writes the cache before the command line returns. Whew! (For details on some potentially dangerous switches, see the sidebar "Beware the Old Switcheroo," page 29.)

Where to Go for HELP

Although identifying a switch can be frustrating work, a switch's letter is usually related to its purpose. You may find some method in Microsoft's madness if you don't try to decipher the switches by themselves, but rather consider a switch *with* its particular command. Think first about what the DOS command does, then what that particular switch may mean.

Does that mean you have to memorize every switch for every command? No, because MS-DOS 5 and later versions provide a help facility for commands and their syntax. The fastest way to get switch information is to enter the command followed by a slash and a question mark. For example, after you type `XCOPY /?`, DOS displays a screen of information giving the command's syntax and a brief description of its parameters and switches.

For more-detailed information, use the DOS on-line help manual. If you type `HELP` by itself on the command line, you'll go to the HELP Command Reference Table of Contents. Here you can select a command by clicking on it with your mouse, or by moving the cursor and pressing Enter.

To go directly to HELP on a certain command, enter `HELP` followed by the command name (`HELP COPY`, for example).

HELP then loads and displays the Syntax page for that command. Here you can get a detailed explanation of the command and its switches.

Included with HELP on most commands are two other pages, Notes and Examples. As their names suggest, Notes gives additional information about using the command, while Examples lists detailed examples of using the command with various switches.

Browsing through HELP, you may discover some lesser-known but powerful switches you can use. My favorites include the following:

- DIR /A displays all files, including hidden and system files.
- DIR /B displays the full paths and filenames of the files, without the header or summary DIR information. Redirect this listing into a file, and you get the full file specifications, which you can then print for reference or use in a batch file.
- MEM /C shows the currently loaded programs in memory. That lets you see easily whether programs and device drivers are loaded into conventional or upper memory. If upper memory is available, run MemMaker (or your memory manager's optimization program) to load drivers and TSR programs there.
- XCOPY /M copies only modified files (those with the archive attribute turned on) and turns off the archive attribute after the copy. You can use it to copy just-changed files for backup purposes. If you're copying to a floppy and the disk fills, simply reexecute the XCOPY command. Since the files already copied have the archive attribute turned off, they won't be included in the next XCOPY.
- RESTORE /P prompts you before restoring read-only files or files that have changed since the backup was made. This ensures that you won't restore over a modified file accidentally.
- REPLACE /R replaces read-only files.
- ATTRIB /S, DIR /S, REPLACE /S, RESTORE /S, and XCOPY /S apply each command to files in child subdirectories, as well.

The Switch Is On

Once you've mastered the basics of switch-hitting, you're ready to move on to more-powerful maneuvers. For example, you can make optional switches the default for a command.

One way to do that is to redefine the command with a DOSKEY macro. (See the accompanying sidebar

DOS TIP

THE EXPLODING TSR TRICK

Certain memory-resident (TSR) programs and device drivers hog memory when you load them. Microsoft's MOUSE.COM, McAfee Associates' VSHIELD, and Intel's SatisFAXion drivers, for example, request two to three times more RAM during loading than they need when they're memory resident. MOUSE.COM initially requests 57,200 bytes, but leaves a resident stub of only 17,088 bytes.

When you ask MemMaker to load programs such as these into upper memory, DOS frequently reports that insufficient memory is available. Consequently, your system loads the programs into conventional memory instead. But you can often force DOS to load an "exploding" driver high by loading it earlier into CONFIG.SYS or AUTOEXEC.BAT. For example, make the command to load MOUSE.COM the first line of your AUTOEXEC.BAT (or load the MOUSE.SYS device driver in CONFIG.SYS). Run MemMaker again; odds are, DOS will have enough room to place the driver into upper memory.

—Lenny Bailes

"Setting Up a Macro Switch," right.) Another method, which works with four specific commands, is to use a DOS environment variable: the DIRCMD variable for DIR and the COPYCMD variable for COPY, XCOPY, and MOVE. DOS automatically uses the switches defined in the environment variable, unless you override them from the command line. To create these environment variables, you use the SET statement. Here's how they work.

The DIRCMD variable, introduced in MS-DOS 5, holds all the desired default switches for the DIR command. The following statement, for example:

```
SET DIRCMD=/O-GEN /A
```

displays files before directories, sorted by extension and then name (/O-GEN). Hidden and system files are also included (/A).

The COPYCMD variable, introduced in MS-DOS 6.2, determines whether DOS prompts you before overwriting files from the command line and in batch files when using COPY, XCOPY, and MOVE. To force the commands to prompt you before overwriting in all cases, set the COPYCMD variable to /-Y:

```
SET COPYCMD=/-Y
```

To have the COPY, XCOPY, and MOVE commands overwrite in all cases without prompting, the COPYCMD variable is /Y:

```
SET COPYCMD=/Y
```

If you don't use the COPYCMD environment variable, the commands prompt you for confirmation when you execute them from the command line, but not when you run them from batch files.

You can override the values of DIRCMD and COPYCMD by entering different switches on the command line when executing the appropriate command. Perhaps the best way to think of these variables is that they provide the default switches unless you enter something else.

As you've seen, mastering DOS command switches can seem downright tricky. But with a little practice, along with HELP and /?, you can become a more-powerful switch hitter. ■

SETTING UP A MACRO SWITCH

If you find yourself using the same switches over and over for a command, you can make those switches the default by using a DOSKEY macro. DOSKEY can redefine DOS commands to include switches automatically, which means you no longer have to remember to type them in each time. With DOSKEY, you can tailor DOS to work the way you do, instead of the other way around.

For example, DEL and ERASE with the /P switch prompt you for confirmation before deleting each file. To make /P the default, first load DOSKEY into your AUTOEXEC.BAT file. (Type in the command `DOSKEY`.) Then create the following two DOSKEY macros:

```
DOSKEY DEL=DEL $1 /P
DOSKEY ERASE=ERASE $1 /P
```

Now whenever you type `DEL` or `ERASE`, you'll get the /P switch. (The $1 is a replaceable DOSKEY parameter, which represents the file specification to delete.)

If you're using a monochrome monitor, perhaps on a laptop, you can create DOSKEY macros to start up several DOS programs in black-and-white. DOSSHELL, EDIT, HELP, MEMMAKER, MSD, and QBASIC all use the /B switch to run in monochrome mode. Create DOSKEY macros incorporating the /B switch for each program you use.

DOS commands aren't the only items that can accept default switches—programs can, too. For example, if you're a WordPerfect user, you'll want to give that program as much memory as possible. You can create a DOSKEY macro that starts WordPerfect with the maximum amount of conventional, expanded, and (in WP6.0/DOS) extended memory each time you type `WP`.

If you're using WordPerfect 5.1, use this macro:

```
DOSKEY WP=WP /R /W=*,* $*
```

For WordPerfect 6.0/DOS, the macro is this:

```
DOSKEY WP=WP /R /W=*,*,* $*
```

The /R switch tells WordPerfect to load its code-overlay file, WP.FIL, into expanded memory (WP5.1) or extended memory (WP6.0/DOS). /W=*,* makes the maximum amount of conventional and expanded memory available for WordPerfect's use. (WP5.1 can't use extended memory.) /W=*,*,* makes the maximum amount of conventional, expanded, and extended memory available. The DOSKEY parameter $* passes everything on the command line—for example, the file to edit or a start-up macro—to the program.

Although you set certain switches as the default through DOSKEY, you can override them easily. Suppose you have a DOSKEY macro with the same name as a DOS command, but you want the DOS command to execute in the standard way. Simply enter a space before the command on the command line. DOSKEY matches according to the exact macro name, and a leading space isn't a match. So in the example above, you could enter [space] `DEL *.BAK` to delete all BAK files without prompting. DOSKEY with a space in front of it won't recognize DEL as one of its macros.

—K.J.

PC TOOLBOX

Play Music For Me

You can add music to your batch programs without an expensive hardware upgrade. How does that sound?

by Robert L. Hummel

In the past our PC systems stood mute, their silence broken only by the occasional and annoying beep. So the question of whether to add sound effects to your batch programs to spice them up has been moot. But the popularity of multimedia has wrought some profound changes on the PC landscape. Today, a sound card capable of blasting out CD-quality sound under program control is the norm for new systems.

But if you have an older computer, you may be reluctant to add a sound card. In some cases, the cost of the hardware could exceed the current value of the PC system. And setting up and programming a sound card isn't simple. Further, limiting your batch programs to systems that use only sound cards can make for a very limited audience.

So what's an audiophile to do? If you've got Basic, you've got a programming language that supports some sound commands. But using Basic isn't without its own problems. First, you have to be sure there's a copy of Basic on the target system. Then you've got to know whether it's IBM's Basic or BasicA interpreter, Microsoft's GWBasic interpreter, or Microsoft's QBasic environment, and customize your program accordingly.

A better option is to use PLAY, a utility that requires no special hardware or software and plays music through your PC's speaker. (See the accompanying program listing, opposite.) PLAY isn't the ticket for reproducing symphonies, but it can add sound effects and simple songs to your otherwise inaudible batch programs.

Bell Ringers

In the Jurassic age of the personal computer, the most common output device was the teletype (TTY). TTYs were cranky, clanky, mechanical nightmares that jammed, ate your paper-tape programs, and generally smelled of hot oil. These dinosaurs came equipped with a small brass bell you could ring by printing the ASCII character BEL (ASCII 7). Trivia buffs will remember that it was the failure of one of those bells that led to trouble in Michael Crichton's book *The Andromeda Strain*.

Eventually, the world moved to electronic terminals, affectionately known as glass TTYs, or dumb terminals. They didn't try to reproduce the bell sound of their TTY ancestors; instead, they simply responded to the BEL character by making a beep or a buzz or some other suitably electronic noise.

IBM's original PC continued the tradition. Rather than a buzzer, however, a small general-purpose speaker and rudimentary control circuitry were designed into it. Under software control, the speaker could be programmed to emit the short, steady tone you hear every time you boot up your computer.

The Beep Goes On

It's easy to get your PC to beep—sometimes. TYPE a non-text file and

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you'll probably also hear a fair number of beeps. The BEL characters embedded in the file as code or data are interpreted by DOS as they're written to the screen. DOS, in turn, beeps the speaker.

Of course, you might not consider sitting at your keyboard and beeping the speaker a productive use of your time. And, let's face it, it's not very convenient. Fortunately, you can package a beep for later use by putting it into a text file. See for yourself by typing the following two lines at the DOS prompt:

```
COPY CON BEL
^G^Z
```

Here, ^G means the Ctrl+G keystroke and ^Z means the Ctrl+Z keystroke. Press Enter after ^Z and DOS will report that it copied one file. Now try your canned beep with the following command:

```
TYPE BEL
```

If all's well, you should be rewarded with a short beep from your PC's speaker. But if you play with this beep awhile, you'll discover a few things about it. First, it never varies—there's no way to change the frequency or length. And, because of that, it soon becomes truly annoying.

Making Noise

Your PC's BIOS (basic input/output system) contains all sorts of useful routines for controlling your disk drives, monitor, keyboard, and more. In fact, there are routines for controlling nearly every part of your PC except one—the speaker. It amazes me that something so simple could have been overlooked so thoroughly.

Despite the BIOS's lack of support in this area, remember that the PC's beep is produced by a real speaker, not a garden-variety buzzer. The PC's speaker is, in fact, under software control. By programming the speaker's control circuitry directly, you can control the speaker and the sound it subsequently produces.

PLAY.SCR creates the PLAY.COM program, which produces music and sound effects through your PC's speaker.

```
N PLAY.COM
A 100
JMP 123
DB 9 3 9 B 0
DB 2 4 5 7
DB 46 47 43 43
DB 7C 3F EC 3B
DB 8F 38 63 35
DB 63 32 8F 2F
DB E4 2C 5F 2A
DB FE 27 C0 25
SUB   AX,AX
MOV   ES,AX
CALL  19A
JNB   12D
RET
CMP   AL,20
JZ    127
CMP   AL,61
JB    13B
CMP   AL,7A
JA    13B
AND   AL,DF
CMP   AL,50
JNZ   144
CALL  22A
JMP   127
CMP   AL,41
JB    169
CMP   AL,47
JA    169
SUB   AL,41
MOV   BX,104
XLAT
CALL  1BF
CALL  1ED
IN    AL,61
OR    AL,3
OUT   61,AL
CALL  22A
IN    AL,61
AND   AL,FC
OUT   61,AL
JMP   127
CMP   AL,4C
JNZ   188
CALL  20A
CMP   AL,40
JA    127
OR    AL,AL
```

```
JZ    127
CBW
MOV   BX,AX
MOV   AX,2469
SUB   DX,DX
DIV   BX
MOV   [102],AH
JMP   127
CMP   AL,4F
JNZ   127
CALL  20A
CMP   AL,6
JA    127
MOV   [103],AL
JMP   127
DB 0 0
PUSH  BX
PUSH  CX
PUSH  DX
SUB   AL,AL
XCHG  AL,[198]
OR    AL,AL
JZ    1AC
CLC
POP   DX
POP   CX
POP   BX
RET
MOV   AH,3F
SUB   BX,BX
MOV   CX,1
MOV   DX,199
INT   21
CMP   AX,CX
MOV   AL,[199]
JMP   1A8
MOV   BX,AX
CALL  19A
JB    1EA
CMP   AL,2D
JNZ   1D3
DEC   BL
JNS   1EA
ADD   BL,C
JMP   1EA
CMP   AL,2B
JZ    1DB
CMP   AL,23
JNZ   1E7
INC   BL
```

```
CMP   BL,B
JBE   1EA
SUB   BL,C
JMP   1EA
MOV   [198],AL
MOV   AX,BX
RET
SUB   BX,BX
MOV   BL,AL
ADD   BL,BL
MOV   BX,[BX+10B]
MOV   CL,[103]
SHR   BX,CL
MOV   AL,B6
OUT   43,AL
MOV   AX,BX
OUT   42,AL
MOV   AL,AH
OUT   42,AL
RET
MOV   BX,A00
CALL  19A
JB    227
CMP   AL,30
JB    224
CMP   AL,39
JA    224
SUB   AL,30
XCHG  AL,BL
MUL   BH
ADD   BL,AL
JMP   20D
MOV   [198],AL
MOV   AL,BL
RET
SUB   AH,AH
MOV   AL,[102]
ES:
ADD   AX,[46C]
JB    23D
ES:
CMP   AX,[46C]
JA    236
RET

RCX
13E
W
Q
```

End

That's the good news. The bad news is that the required programming is quite arcane. It involves using the PC's IN and OUT assembly-language instructions and knowing how to program the multichannel 8253 timer chip on the system board. Fortunately, there's a better solution: Simply use the PLAY utility I've written for you.

Of course, before you can use PLAY, you'll have to create it. To convert the Debug script PLAY.SCR to the executable program PLAY.COM, follow the instructions in the "Debug Scripts" section of "How to Use This Magazine" (pages 78–80 in this issue).

The PLAY Utility

The PLAY utility is based on the Basic PLAY statement and uses a compatible subset of command arguments. To keep the program size small, I've had to eliminate fancy options, such as tempo control and dotted notes. Still, the PLAY utility lets you specify the frequency and duration of notes and play them through the PC speaker. The accompanying table (above) shows the arguments that PLAY accepts and their definitions.

COMMANDS FOR THE PLAY UTILITY

A–G	Plays a note in the range A through G. Notes may be modified with #, +, or - symbols.
+,#	Following a note, changes it to a sharp.
-	Following a note, changes it to a flat.
P	Pause or rest; no sound produced.
L*n*	Sets length of each note or pause. L1 is a whole note; L4 is a quarter note (one whole note = 2 seconds). Range for *n* is 1 to 64. (Although it will accept all legal arguments, a 1/16 note is really the shortest note PLAY can reproduce.) Length applies to all subsequent notes until another L command is encountered.
O*n*	Sets the octave. Range is 0 to 6. Default octave is O3 and contains concert A (440Hz). Middle C is first note of octave 4 (O4). Octave affects all subsequent notes until another O command is encountered.

You can use PLAY in two different ways. The first is directly from the keyboard. Simply execute the program by typing `play` at the DOS command prompt. From that point on, PLAY will try to interpret everything you type as a command. It ignores invalid characters.

Try typing the letter `A` (uppercase or lowercase) and pressing the Enter key. You'll hear a beep from your speaker. The tone will be at 440Hz (the pitch "concert A") and last a half second. This is the note to which most concert instruments are tuned. It may be only coincidence, but it's the same tone most PCs use for their default beeps.

You can continue to type notes and other commands directly into PLAY. You'll need to press Enter at the end of each command line before PLAY will interpret them. Use the O and L commands to change the octave and length of the note. For an idea of what you can do with this program, enter the following line into PLAY, and press Enter:

```
O3 L16 CP CC DP CP PE PF
```

When you're done with PLAY, terminate the program by pressing Ctrl+Z or Ctrl+C.

Getting Creative

Sure, running PLAY at the command line is an interesting way to while away the hours. But PLAY really shines when you use it with a command file. Because PLAY reads from standard DOS input, you can use the DOS redirection command to tell the program to read input from a file instead of the keyboard. For

QBasic TIP

QUICKER QBASIC

When speed is of the essence, try revving up a QBasic program by adding a DEFINT A-Z statement to the beginning of the listing. This changes the default variable type from single-precision floating point to integer. Integers are processed much faster than floating-point numbers, especially in FOR loops. You should use them whenever you are dealing with whole numbers between –32768 and 32767.

After adding a DEFINT statement to the main program, you also must insert one before each existing procedure and function. (After you set integers as the default variable type, QBasic automatically adds a DEFINT statement to any new procedures or functions that you create.) When you try to insert a line before a SUB or FUNCTION line, you'll get the following message:

```
Blank lines not allowed before SUB/FUNCTION line. Is remark OK?
```

After QBasic inserts its comment mark, an apostrophe ('), delete it and type in a DEFINT statement.

—Barry Colwell

example, using any text editor that saves in ASCII format, create a file called SHAVE.NOT that contains the command sequence shown above. Now you can use the following command to play that file:

```
PLAY < SHAVE.NOT
```

I'm no composer, but I've put together a few command files that play songs you should recognize. (See below.) The listing for STAR.NOT plays a simple rendition of "Twinkle, Twinkle, Little Star." The ZONE.NOT file plays a rough approximation of the *Twilight Zone* theme. (I have my PC play this one when it boots.)

Playing music on your PC—even crude music—is fun. But if you need more than fun to motivate you, consider this: Adding sound to your batch programs can actually enhance your productivity.

For example, I wanted to automate the process of formatting a 1.4MB floppy disk, but ran into two problems. First, I had to eliminate the FORMAT prompts to start the format, label the disk, and format another disk. To do so, I created the FORMAT.RSP file (above) and stored it in my C:\BAT directory. The first two lines of FORMAT.RSP are blank; the third contains only the character N. As a result, the command TYPE C:\BAT\FORMAT.RSP | FORMAT A: /U lets me format a disk with no interaction at the keyboard. Note that you must specify FORMAT.RSP's full path.

Although I can now format a disk automatically, it still takes a long time. As a result, I'm usually across the room, involved in some other project when the format finishes. To alert me that the format is complete, I added a command to play KLAXON.NOT (left) to the batch program FMTA.BAT (above). When processing is finished, my PC wails like a European siren.

The FORMAT.RSP file contains two blank lines and an N as answers to the FORMAT command's prompts.

```


N
```

End

FMTA.BAT formats a disk and lets you know when it's done.

```
TYPE C:\BAT\FORMAT.RSP | FORMAT A: /U
PLAY < C:\BAT\KLAXON.NOT
```

End

Other sound effects you might find useful (left) are two types of telephone rings, FONE1.NOT and FONE2.NOT. Upward and downward trills are given as UP.NOT and DOWN.NOT and might be useful for batch programs that copy files. To play longer songs or combinations, use several PLAY command lines or put PLAY into a batch-program loop.

The STAR.NOT command file plays "Twinkle, Twinkle, Little Star."

```
CCGGAAGPFFEEDDCPGGFFEEDPGGFFEEDPCCGGAAGPFFEEDDC
```

End

Play a portion of the *Twilight Zone* theme with the ZONE.NOT command file shown here.

```
L8 O4 FF+FD FF+FD FF+FD
```

End

This is the command file for KLAXON.NOT, a European-siren sound.

```
CFCFCFCF
```

End

The FONE1.NOT command file produces a single telephone ring.

```
L32 CF CF CF CF CF CF CF CF L2P
L32 CF CF CF CF CF CF CF CF L2P
```

End

The FONE2.NOT command file produces a double telephone ring.

```
L32 CF CF CF CF L8P
L32 CF CF CF CF L2P
L32 CF CF CF CF L8P
L32 CF CF CF CF L2P
```

End

Trill up the scale with the UP.NOT command file.

```
L16 C C+ D D+ E F F+ G G+ A A+ B
```

End

Or trill back down the scale with the DOWN.NOT command file.

```
L16 B A+ A G+ G F+ F E D+ D C+ C
```

End

PLAY It Again

A CD-quality sound card it's not. But PLAY's potential uses in everyday batch programs are many. Try adding alarms, error beeps, and reading music to your programs and see whether they're not more pleasing to your ear. ■

BATCH-FILE MEDIC

A Batch-File Breakthrough: Part II

Tantalized by last issue's revelation of a new way to parse strings with the forward slash? We continue our explorations with a few advanced tricks.

by Hardin Brothers

Last issue, I introduced you to a new technique that lets you parse strings in batch files: using the forward slash (/) in the set of a FOR-IN-DO command.

The slash acts as an escape code that breaks a subsequent string into two parts. Thus, you can now break a filename into its base name and extension. Once you have a filename broken into its two components, your batch files can handle all sorts of file-management chores.

I ended the last installment with a couple of simple batch files that demonstrate the technique. (To refresh your memory, see the accompanying sidebar, "The Slash Revisited," page 40.) This time around, we'll apply the technique to a more-complex problem: deleting backup files for which an original file exists.

For example, if the batch file finds a file named TEST.BAK, it will delete the file only if the directory contains another file named TEST.TXT, TEST.WP, or TEST.DOC.

Scanning a Directory

Now that you can extract base filenames from full filenames, it's time to face the other obstacles this month's problem presents. The first task is to outline what the complete batch file will do:

```
For each subdirectory on the drive:
  For each file with a "temporary" extension:
    Extract the base name.
    For each "permanent" extension:
        Make a new filename from the base and the permanent extension.
        If the permanent file exists, delete the temporary file and continue with the next temporary filename.
```

Although this brief outline seems simple enough, it conceals a major problem of its own: It contains three loops that start with the word *For*.

If you were using the languages QBasic, C, or Pascal, the loops would be simple to implement. But loops in DOS's batch language are tougher to build.

Normally, the best way to create a batch-file loop is with a FOR-IN-DO command. But FOR-IN-DO allows only one command after DO, and you need to put several commands together in each loop.

To do that, you can use CALL as the single command and start another batch file. But then a second problem arises: You'll have to write and maintain several batch files to do one task, which can be pretty messy.

Luckily, there's a simple way to avoid writing a whole series of batch files: Write one file and have it call subroutines within itself. That can be tricky. You have to call the entire batch file and send it a parameter that tells it the routine you want to run. When that subroutine is done, the second copy of the batch file ends and returns you to the original copy.

For example, once you find a file with a temporary extension, you have to call a subroutine to extract the base name.

Assuming that the section of the file that extracts base names is

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Technical Editor Hardin Brothers has been working with computers and writing about them for 15 years.

called GETBASE, the syntax for calling this subroutine is as follows:

```
CALL %0 GETBASE
```

The %0 is the DOS command-line parameter containing the name of the current batch file. The GETBASE part of that line tells the new copy of the batch file what routine you want to run. If you need to, you can place additional parameters on the same command line.

The other difficult task in the outline above is running the batch file in every subdirectory on a drive. You can do that in any of several ways, but we'll ignore them for now and write a batch file that will find and erase all backup files in the current directory. That will make the batch file easier to write and test. We'll solve the directory problem later.

Setting Up

The program needs 120 bytes of environment space, according to my calculations. The space for each variable includes the variable name, the equal sign, the length of the data in the variable, and a terminating byte at the end of the variable. Therefore, the following environment entry:

```
TEST=XYZ
```

would use 9 bytes: 4 bytes for TEST, 1 byte for =, 3 bytes for XYZ, and 1 byte for the terminator.

In the first program listing (_DELBAK.BAT, page 38), lines 19 through 26 make sure that the environment has enough space. If not, the program jumps to the NO_ENV label, reports that it needs more environment space, and ends. (I'm ignoring the earlier lines on purpose for the time being.)

Lines 28 to 42 create a list of extensions for permanent and

DOS TIP

FOR TIMES TWO

DOS's FOR statement packs a lot of power, letting you accomplish a great deal with a single line of code. If you want to see a list of all the TXT and DOC files in a directory, for example, type this line at the DOS prompt:

```
FOR %F IN (*.TXT *.DOC) DO DIR /B %F
```

In a batch file, that same line would read:

```
FOR %%F IN (*.TXT *.DOC) DO DIR /B %%F
```

Unfortunately, FOR doesn't offer a built-in method for performing two actions at once, so it won't let you both display the name of each TXT and DOC file and then copy it to a backup directory. But as my batch file, FORETEST.BAT, shows, you can use recursion and a short subroutine to accomplish this task with a minimum of fuss.

FORETEST.BAT begins by testing for the existence of the parameter #LOOP#. The first time through the program, this test fails, and the FOR command is executed. The FOR line establishes TXT and DOC files as the files to act on and tells DOS to execute FORETEST.BAT again, this time with the parameter #LOOP#. On the second run through, the batch file's IF test passes, so control moves to the routine called LOOP.

There, the name of the first TXT file is shifted into %1, DIR /B displays the filename on screen, and the XCOPY command copies the file to C:\BACKUP. Control returns to the FOR command in the main program, the second TXT file becomes %2, FORETEST.BAT is executed again, and control passes to LOOP a second time. Looping continues until DOS finds no further TXT or DOC files to act on. At that point, control passes to the GOTO END statement, and the program ends.

—Frets Olivares

FORETEST.BAT uses recursion to allow the FOR command to take two different actions on a set of files. As written, the program displays a brief directory listing of each TXT and DOC file in the current directory and then copies it to C:\BACKUP, but you may substitute other actions.

```
@ECHO OFF
IF "%1"=="#LOOP#" GOTO LOOP
FOR %%F IN (*.TXT *DOC) DO CALL %0 #LOOP# %%F
GOTO END

:LOOP
SHIFT
REM This line contains the first action:
DIR /B %1
REM This line contains the second action:
XCOPY %1 C:\BACKUP

:END
```

End

_DELBAK.BAT locates temporary files and deletes them from a directory. Note that lines are numbered for your reference only. Don't type in the line numbers or the colons following them; start with the command in each line.

```
1 : @ECHO OFF
2 : REM _DELBAK.BAT – This batch file erases all
3 : REM  temporary files in the current directory
4 : REM  if (and only if) a "permanent" file with
5 : REM  the same base name exists in the same
6 : REM  directory.  The extensions for backup
7 : REM  and permanent files are set in the first
8 : REM  few lines of the batch file.
9 :
10 : REM Jump to the correct subroutine if this
11 : REM  batch file has called itself:
12 :
13 : IF NOT "%1"=="" GOTO %1
14 :
15 : REM Free up temporary environment space if any
16 : REM  has been passed to us:
17 : SET ENVTP=
18 :
19 : REM Make sure we have 120 bytes of environment
     space free
20 : SET X=2345678901234567890123456789012345678900
21 : SET Y=2345678901234567890123456789012345678900
22 : SET Z=2345678901234567890123456789012345678900
23 : IF "%Z%" == "" GOTO NO_ENV
24 : SET X=
25 : SET Y=
26 : SET Z=
27 :
28 : REM Set the backup file extensions.  If you need
29 : REM  to add more, you will also have to modify
30 : REM  the FOR-IN-DO command that uses them
31 :
32 : SET B1=.BAK
33 : SET B2=.BK!
34 : SET B3=.ASC
35 :
36 : REM Set the permanent file extensions. If you
37 : REM  need to add more, you will also have to
38 : REM  add IF EXISTS tests to look for them.
39 :
40 : SET P1=.TXT
41 : SET P2=.WP
42 : SET P3=.BAT
43 :
44 : REM Now get to work. Generate a list of all
45 : REM  temporary files in the directory and then
46 : REM  call a subroutine to generate the base name
47 : REM  of each
48 :
49 : FOR %%F IN (*%B1% *%B2% *%B3%) DO CALL %0
     GETBASE %%F
50 : GOTO MAIN_DONE
51 :
52 : REM This is the subroutine that extracts
     a base filename
53 : :GETBASE
54 :
55 : IF "%2"=="" GOTO DONE
56 : SET TMPFIL=%2
57 : SET TNAM=%TMPFIL%Ω
58 : SET BASE=
59 : SET CH=
60 :
61 : :GB_LP
62 : IF "%TNAM%" == "Ω" GOTO GB_DONE
63 : SET TP=%TNAM%
64 : FOR %%A IN (/%TNAM%) DO SET TNAM=%%A
65 : FOR %%A IN (/%TP%) DO IF %%A%TNAM% == %TP% SET
     CH=%%A
66 : IF "%CH%" == "." GOTO GB_DONE
67 : SET BASE=%BASE%%CH%
68 : GOTO GB_LP
69 :
70 : REM Now the base name is in BASE and the
     temporary
71 : REM  filename is in TMPFIL.  Call another
72 : REM  subroutine to search for permanent files
73 : REM  and possibly delete the temporary file
74 : :GB_DONE
75 : CALL %0 FINDPERM
76 : GOTO DONE
77 :
78 : REM This is the subroutine that erases the
79 : REM  temporary file if a permanent file exists
80 : :FINDPERM
81 :
82 : IF NOT EXIST %BASE%%P1% GOTO FP2
83 : ECHO Deleting %TMPFIL%
84 : DEL %TMPFIL% > NUL
85 : GOTO DONE
86 :
87 : :FP2
88 : IF NOT EXIST %BASE%%P2% GOTO FP3
89 : ECHO Deleting %TMPFIL%
90 : DEL %TMPFIL% > NUL
91 : GOTO DONE
92 :
93 : :FP3
94 : IF NOT EXIST %BASE%%P3% GOTO FP4
95 : ECHO Deleting %TMPFIL%
96 : DEL %TMPFIL% > NUL
97 : GOTO DONE
98 :
99 : :FP4
100 : ECHO No permanent file found for %TMPFIL%
101 : GOTO DONE
102 :
103 : REM Error message if out of environment space
104 : :NO_ENV
105 : ECHO Insufficient Environment Space –
      Program Stopping
106 :
107 : REM Free up the environment space we've used
108 : :MAIN_DONE
109 : SET B1=
110 : SET B2=
111 : SET B3=
112 : SET P1=
113 : SET P2=
114 : SET P3=
115 : SET TMPFIL=
116 : SET TNAM=
117 : SET BASE=
118 : SET CH=
119 : SET TP=
120 :
121 : :DONE
122 :
```

End

DELBAK.BAT deletes backup files from all directories on your hard disk. Lines are numbered for your reference only. Don't type in the line numbers or the colons following them; start with the command in each line.

```
1 : @ECHO OFF
2 : REM  DELBAK.BAT - Calls _DELBAK.BAT in every
3 : REM   subdirectory of the current volume to
4 : REM   erase unnecessary backup files.
5 :
6 : REM The data in the following SET line must be at least
7 : REM 113 characters long
8 : REM
9 : SET ENVTP=1234567890123456789012345678901234567890123456789
   01234567890123456789012345678901234567890123456789012345678900123
10 : IF "%ENVTP%" == "" GOTO NO_ENV
11 :
12 : REM Create a list of directories on this drive
13 : ECHO Creating list of directories ... Please be patient!
14 : ECHO.
15 : DIR \ /S | Find "DIRECTORY" >  DIRLIST
16 : ECHO Exit                     >> DIRLIST
17 : ECHO The list has been created.  Thanks for waiting!
18 : ECHO.
19 :
20 : REM Create DIRECTOR.BAT, which will run in every directory
21 : ECHO @CD %%2  >  C:\BATCH\DIRECTOR.BAT
22 : ECHO @_DELBAT >> C:\BATCH\DIRECTOR.BAT
23 :
24 :
25 : REM Now execute DIRECTOR.BAT in all directories
26 : COMMAND < DIRLIST
27 : GOTO DONE
28 :
29 : :NO_ENV
30 : ECHO  Insufficient environment space to continue
31 : ECHO  Do not run this program from a DOS shell
32 : ECHO.
33 : ECHO  If necessary, use the SHELL command in CONFIG.SYS
34 : ECHO  to increase the amount of available environment space.
35 : ECHO.
36 :
37 : :DONE
38 : REM Time for cleanup
39 : IF EXIST DIRLIST DEL DIRLIST > NUL
40 : IF EXIST C:\BATCH\DIRECTOR.BAT DEL C:\BATCH\DIRECTOR.BAT > NUL
41 :
```

End

backup files. You can expand or shorten the list to fit your needs. You might be surprised to see .ASC on the list of backup file extensions, but on my system, I often use a word processor to create and edit electronic mail messages.

Once I've written the message and saved it in the word processor's native format, I save it in ASCII format to send it through CompuServe or the Internet. It's vital to my consulting business to keep a copy of every message, but I don't need to keep both the .ASC and the word-processor files.

The Heart of the Matter

Lines 49 and 50 are the heart of the program: They find every backup file in the current directory and send its name to the routine called GETBASE in line 53. That routine stores the name of the temporary file and its base name in the environment and then calls the routine named FINDPERM.

Technically, you don't have to implement FINDPERM as a subroutine. But I've found that the time required to execute FINDPERM as a subroutine is minimal, and using it makes the batch file easier to change for other file-maintenance operations.

The FINDPERM routine starts in line 80 and simply looks for a permanent file with the same base name as the temporary file. If its search is successful, FINDPERM deletes the temporary file. If the search fails, FINDPERM reports that it can't find the base file.

_DELBAK.BAT in the first listing is just over 120 lines long, but if you remove the REMs and the blank lines, which I've added to make it easier to read and debug, it will be about half that length.

Once you've typed in or downloaded the program, set up a temporary subdirectory and add some permanent and backup files to it. Run _DELBAK.BAT in that directory several times, changing the files available, until you're sure that it's working. Then you're ready to clean out your entire disk.

The Cleanup

As I said earlier, there are several ways of running a batch file in every directory on your hard disk. The easiest is to borrow from a technique I presented in "Batch Files, Basically" (*DOS World* #18, November 1994, page 35).

Everything you need is in the second listing (DELBAK.BAT, above), which assumes that the directory C:\BATCH is in your path and contains _DELBAK.BAT. To begin, DELBAK.BAT creates an environment variable called ENVTP. _DELBAK.BAT will delete this variable and free up enough space for itself. This trick of reserving space with a variable is necessary to pass to _DELBAK.BAT an environment large enough to work with. If the second listing is unsuccessful, it displays an error message and then ends.

DELBAK next creates a list of directories on the current drive and saves them in a file called DIRLIST (line 15). The DIR command creates a list of all directories and files on the drive, which it sends to FIND. The FIND command discards all lines in the list except those that contain the word DIRECTORY. The result is a file in this format:

```
DIRECTORY OF C:\
DIRECTORY OF C:\4DOS
DIRECTORY OF C:\AT
DIRECTORY OF C:\BIN
DIRECTORY OF C:\BOOT
```

On a large hard drive, DELBAK may need a few moments to create this file, so the program lets you know the cause of the delay.

Lines 20 through 22 create a new batch file called DIRECTOR.BAT, with two lines. The first changes to a new directory with the command @CD %2. The second line runs _DELBAK.BAT in that directory.

Line 26 ties everything together. It starts a new copy of COMMAND.COM and uses redirection to pass to it the contents of DIRLIST as a series of commands. When COMMAND.COM sees the first line, DIRECTORY OF C:\, it interprets it as a command to run the program DIRECTOR.BAT and pass to it the parameters OF and C:\. DIRECTOR.BAT takes over, uses CD to change to the C:\ directory, and then runs _DELBAK. When _DELBAK is done, it returns to COMMAND.COM, which reads the next line (DIRECTORY OF C:\4DOS) as the next command. The last command in DIRLIST is EXIT, which sends control back to the original batch file, which can then clean up by deleting DIRLIST and DIRECTOR.BAT.

Unfortunately, DELBAK.BAT isn't very fast. The FOR-IN-DO loops that find the base name in a filename are particularly slow. So once you get DELBAK and _DELBAK running, feel free to start them and then take a break for 10 or 15 minutes.

In future issues, I'll explore the batch language's string-handling abilities in more detail. We've just scratched the surface of this exciting but undocumented feature. ■

THE SLASH REVISITED

DOS interprets a slash within the *(set)* portion of a FOR-IN-DO command as an escape character. FOR-IN-DO discards the slash and interprets the next character as a single-byte parameter. If you display the variable following FOR, you'll see that the command breaks the string in the set into two lines. For example, this line:

```
FOR %%C IN (/WHEEL) DO ECHO %%C
```

displays the following two lines:

```
W
HEEL
```

FOR-IN-DO sees the contents of the set as /W and HEEL. To interpret the /W, FOR-IN-DO discards the slash and accepts the W as the first character.

The batch files VERT.BAT and EXTRACT.BAT (right) demonstrate the technique. To run VERT.BAT, type VERT followed by a word. For example, this command:

```
VERT DOSWORLD
```

will display this arrangement:

```
D
O
S
W
O
R
L
D
```

EXTRACT.BAT breaks a filename into two parts: the base name and the extension. To use EXTRACT.BAT, type EXTRACT followed by a filename. For example, if you type this:

```
EXTRACT SAMPLE.TXT
```

your screen will display the following lines:

```
Original filename: SAMPLE.TXT
Base of filename: SAMPLE
```

—H.B.

VERT.BAT uses DOS's FOR-IN-DO command and the forward slash to break strings into characters and display the contents of the command line vertically. To create the omega in DOS's EDIT.COM text editor, hold down the Alt key and type its ASCII code, 234, on the numeric keypad (Num Lock on). When you release the Alt key, the omega will appear on screen.

```
@ECHO OFF
CLS
SET CMD=%1Ω
:LP
SET ORIG=%CMD%
IF "%CMD%"=="Ω" GOTO DONE
FOR %%A IN (/%CMD%) DO SET
  CMD=%%A
FOR %%A IN (/%ORIG%) DO IF
  %%A%CMD%==%ORIG% ECHO
  %%A
GOTO LP
:DONE
SET CMD=
SET ORIG=
```

End

EXTRACT.BAT uses the FOR-IN-DO slash to separate a filename's base name and extension. You can apply this batch-file tool in any number of ways, including automatic comparison and deletion of multiple file copies.

```
@ECHO OFF
SET NAME=%1
IF "%NAME%"=="" GOTO DONE
SET TNAME=%NAME%Ω
SET BASE=
SET CHAR=
:LP
SET TEMP=%TNAME%
IF "TNAME%"=="Ω" GOTO DONE
FOR %%A IN (/%TNAME%) DO
  SET TNAME=%%A
FOR %%A IN (/%TEMP%) DO IF
  %%A%TNAME%==%TEMP% SET
  CHAR=%%A
IF "%CHAR%"=="." GOTO DONE
SET BASE=%BASE%%CHAR%
GOTO LP
:DONE
ECHO Original filename:
  %NAME%
ECHO Base of filename:
  %BASE%
SET CHAR=
SET TEMP=
SET TNAME=
```

End

SPECIAL REPORT: ON-LINE ACCESS

An Internet Primer

The ever-widening information highway can seem like a complex monster, but it has much to offer DOS users. Before flowing with the traffic, though, you'll need to know how the Internet works and what it can do for you.

by David H. Rothman

F*ortune* magazine once ran a photo of the entrepreneur who's hooked me into the Internet—the giant dataway that makes Al Gore's pulse quicken. Right in the middle of a grassy field, amid farm animals, Jamie Clark posed at the keyboard of a desktop computer. Jamie is a sheepherder. Luckily, his dog was on the job, leaving Jamie plenty of time to tend ClarkNet, my lifeline to the Internet.

Jamie's what you call an Internet provider. Though not every provider is as small as ClarkNet, Jamie's case isn't unusual. Good providers come in all sizes, and so do bad ones. How do you pick the right outfit and get the services *you* need? The standard caveat applies: Read up on the topic first; buy the right books and magazines. And talk to crazed friends with circles under their eyes from working the Net at 3 A.M. Then you can take advantage of the accompanying sidebar here, "Ten Questions to Ask Your Internet Provider" (page 42). Often you'll have to choose between two alternatives: *dial-up account* (a remote, terminal-style connection to your provider's computer) and *SLIP* or *PPP connection* (a direct hookup to the Internet).

With a dial-up account, the main action happens on the provider's machines, not yours. You use your computer to issue commands to, say, ClarkNet. And your provider's machines store and run the programs through which you read mail, peruse electronic libraries, and enjoy the Net's other delights.

With a SLIP or PPP connection, you're still using regular phone lines, your modem will still dial up your provider, and you're still geographically remote. But you're beyond "teminal": Your computer is on the Net directly.

SLIP stands for *serial-line interface protocol*; PPP is *point-to-point protocol*. SLIP is more common, but PPP connections are a little faster. (See the "Checking Out Internet Services" section, page 42, for more information on SLIP and PPP and various other key services you may want to look for.)

A SLIP or PPP connection, once working, is easier to use than a dial-up account. You can point-and-click your way through the Internet, or at least navigate with fewer hassles. Blessed with efficient SLIP/PPP software of your own choosing, you can read and write your e-mail faster. Typically, you can pick up information from an electronic library and paste it into a letter you're writing. So, while a SLIP/PPP connection is hard to set up and costs more, it might still be worth it.

Of course, rather than pay a provider, you may be able to hook up through a college or university already on the Net. Colleges offer accounts to students and faculty and, occasionally, to the public. What's more, many businesses and government agencies are bestowing Net accounts on their employees. However—and this is important—you should check with your boss about personal use of the Net; it abounds with career-threatening temptations.

If you choose to hunt for your own provider, unless you're lucky, you won't find *Internet* or *Internet Provider* listed in the Yellow Pages.

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The good news is that providers are available in many states (see the "Somewhere Out There" sidebar, page 46, for a representative listing), but beware: Because providers change and new services become available, any published list is obsolete as soon as it's in print.

Lists of providers are published in several books about the Internet. For example, *Connecting to the Internet*, by Susan Estrada (O'Reilly and Associates, 800-998-9938; $15.95), includes a list of large and small companies, and tells how to evaluate potential providers. *The Whole Internet User's Guide & Catalogue*, by Ed Krol (also from O'Reilly & Associates; $24.95), lists Internet providers in an appendix. (See the "Further Reading" sidebar, page 45, for a list of four additional recent books covering various aspects of using the Internet.)

Frustratingly, if you're not hooked in yet, the most up-to-date list of providers is on the Net itself. If possible, ask a kind soul to request it via e-mail. He or she should write to **info-deli-server @netcom.com** (no space between *r* and @) and type `send pdial` in the subject line or the message area.

The least-expensive way to connect to the Internet is through a major on-line service, such as GEnie, Delphi, America Online, or BIX. But not all services are created equal; for example, some don't offer access to as many electronic libraries and other services as a regular Net provider would. Yet another possibility is finding a bulletin-board service (BBS) that offers an Internet hookup; check with your local computer user group.

If your budget is tight, you might be within range of one of the many free networks that are sprouting up in any number of communities. Be prepared for busy signals on these worthy but underfunded nets. And remember: You might have to pay for local phone calls. To learn about the free and low-cost networks closest to you, contact the National Public Telecomputing Network (216-247-5800).

Checking Out Internet Services

From my apartment in Northern Virginia—across the river from Maryland—I dial up Jamie's computers on his farm near Baltimore. My modem reaches one of the many incoming phone lines for ClarkNet clients. I can choose between dial-up service and the SLIP/PPP variety. Jamie's computers will store the messages others write to me, and if I'm on dial-up rather than SLIP/PPP, I can use his computers' software to read e-mail or send my own.

The necessary software is on Jamie's own collection of machines. Of course, if I'm using SLIP, I can go on the Net directly and work with an e-mail program running on my own 486DX clone. Jamie's computers offer popular Windows shareware for SLIP/PPP; elsewhere on the Net you can find goodies for good old DOS.

But what about the actual services Jamie's account lets me enjoy? Unlike many providers, he offers all the major ones:

- **E-mail.** I've used electronic-mail services before, but on the Net, I can "talk" to Australia and not pay a penny extra at the end of the month. The Net itself handles the transmission of messages, files, and my outrageous opinions—from one computer to the next, across the country or around the world. Quite understandably, e-mail is the most popular service on the Net. Your provider may offer any number of mail programs; one of the more popular is Pine.

- **Usenet news.** You won't find *The New York Times* here. The term "news" refers to messages shared among those with common

TEN QUESTIONS TO ASK YOUR INTERNET PROVIDER

- What services can the company offer beyond basics such as electronic mail and Usenet?
- What do the services cost?
- How much time on the Net does the fee include? Are there any catches, such as the amount of time you can spend on the Net each day?
- What modem speeds can your provider accommodate? Does the service charge extra for higher speeds, up to 28,800 bits per second?
- What is the ratio between the number of customers and the number of modems? (ClarkNet tries to keep the ratio at 10:1. The idea is to avoid inflicting too many busy signals on people dialing into the service.)
- If you'll be dialing your provider's computer and picking up messages, how much storage space will you enjoy for free on the host system's hard drive?
- How frequently will the provider back up the hard drive containing your messages and other material?
- Does the provider offer any menus to simplify the commands you'll need? Most Net providers use UNIX computers, and some DOS users may feel lost. Luckily, you need to know only basic commands, such as how to copy and delete files. But with special menus to guide you through UNIX, life can be simpler. (For more on bridging the gap between UNIX and DOS, see Anthony Owens's sidebar "SLIPping onto the Net," opposite.)
- Can the provider get you on the Net directly? That is, can you get SLIP or PPP service?
- How much technical help does the service offer, and in what forms? What are the credentials of the people offering it? Is help available by phone?

—D.H.R.

interests—the kind you and I might post on a BBS.

Usenet consists of thousands of topic areas or newsgroups. Different newsgroups fall into different "hierarchies." For example, the names of those dealing with computers start with **comp**, as in **comp.os.msdos.apps**. **os** means *operating system*. **msdos** limits the scope of the group. **apps** tells you that the newsgroup covers applications running under MS-DOS. Another hierarchy begins with **alt**, short for *alternative*. Some of these alternative groups are bizarre, but most, such as **alt.books.technical**, are pretty tame.

- **Gophers.** The term *gophers* refers to computer sites along the Internet, and to the software that runs on these server computers.

Gophers are search programs you use to look at the thousands of libraries (electronic and print) run by companies, universities, other institutions, and even individuals—each with a hook to the Internet. Gophers can easily run through a library's card catalogue, where they'll look for book titles, authors, or articles. Internet users employ them most often, however, to find collections of files—electronic libraries.

Gophers are located on any number of computers, and although you connect to a Gopher at a single site, it may check thousands of electronic locations for the information you need. Through a Gopher, you can reach special areas of the Net containing electronic books, such as the Bible or classic novels, or you can search libraries of on-line files.

- **Archie.** This software tracks the whereabouts of programs or files by name. With Archie, your request returns a list of computer nets that store the file you're after. Archie will also list the directories on the system containing that file; you'll need that information to transfer the file to your computer. You'll need something called *FTP*, too.

SLIPPING ONTO THE NET

To use a DOS or Windows-based computer on the Internet, unless you connect via a "shell account" (see below), you have to bridge the gap between the UNIX world and the world of DOS. You can probably find the necessary programs and network drivers right on the Internet itself. (Winsock, for example, makes the translation virtually seamless for Windows.) But that's only the beginning. Your next step in getting onto the Net is to consider three specific ways to connect from a DOS environment, each one varying in performance and cost.

How to Reach Everything

If you want to connect to the graphics-oriented World Wide Web, then at the very least, you must have a SLIP/PPP (serial-line interface protocol/point-to-point protocol) connection. The more popular is SLIP, which means that your computer—for the duration of the Internet call—becomes part of the Net. SLIP gives you access to everything the Internet has to offer, including e-mail, newsgroups, FTP, Telnet, and IRC (Internet Relay Chat).

SLIP accounts usually carry a per-hour cost, as low as $1. Because they require some initial maintenance, however, most providers charge a start-up fee—anything from $35 on up. While they may be reasonably priced, SLIP accounts are also very slow, since you access them through a dial-up line. Plan to spend a lot of time on line. (Anything below 14,400 bps is probably too slow for a SLIP connection.)

The Internet Shell Game

A second way to connect to the Internet is via a *shell account*, which essentially lets you rent space on a UNIX machine. You don't need special software or drivers. A shell-account provider has a phone number you call, just as you would a computer bulletin-board system (BBS). A text-based version of the World Wide Web, plus FTP, Telnet, newsgroups, e-mail, and IRC, are all available through a shell account.

Major advantages of a shell account are cost and simplicity. Because you aren't accessing large amounts of data in real time, as with a SLIP account, you don't use a lot of resources. Shell accounts can cost as little as $15 a month for unlimited access, and possibly less, depending on what services you use.

Major disadvantages, however, are that a shell account is totally text-based, and you must know a few basic UNIX commands to get the most from it. Also, because you're renting space on another computer instead of renting access for your computer on the Internet, there's usually a limit on the amount of space you can occupy before extra charges begin. Typically, the limit is between 5 and 10 megabytes; additional space is usually $1 per megabyte.

A Dedicated Surfer

If you want a speedy Internet experience and are willing to pay the price, you can connect via a *dedicated line*. Think of a dedicated Internet connection as your phone being off the hook 24 hours a day, sending and receiving information.

By far, this is the most-expensive connection to maintain, often running into thousands of dollars a month. Accordingly, most dedicated Internet connections are through educational institutions, military installations, and businesses, since accessing someone who already has a dedicated connection will cost you less than buying your own dedicated line.

Speed is the obvious advantage of a dedicated connection. Most Internet users, however, choose to put up with information log jams rather than dig deep.

—Anthony Owens

- **FTP.** File Transfer Protocol is a program that retrieves text or program files from electronic libraries (those whose names you've just found with Archie).

- **Telnet.** With this program, you can boss around far-off computers. Via Telnet, a remote-control program, you can issue commands to machines at the Library of Congress and use the book catalogue as though you were typing on a machine at the library itself. Telnet is also a nice way to keep up with your electronic mail when out of town. You can call in from another machine anywhere in the world and hook up to your regular account, as though you were at your regular computer. No need to get into your own PC: Rather, by way of the Internet itself, you're reaching your *account* without the usual long-distance charges.

- **World Wide Web.** This is without a doubt the hottest area of the Internet right now. You can find electronic libraries; ads for the White Rabbit toy store or Godiva chocolate; public-transit schedules for certain cities; an on-line version of *Time* magazine; and on-line editions of newspapers from North Carolina, California, Russia, the United Kingdom, and countless other places around the world.

The material on the Web is in a common format known as *HTML* (*Hypertext Markup Language*). Any document on the Web can contain links to any other file there.

By way of mouse clicks or the appropriate keystrokes, you'll be able to whiz from one library to the next. From the White Rabbit store (located at **http://www.toystore.com** [no space between *e* and .]), for example, you can choose a link to other child-related areas of the Net.

These are the programs and services I need most often. Charges for Telnet, FTP, Archie, and so on vary from provider to provider. Your Internet provider may offer more, but be certain to ask.

Typically, you'll pay from $15 to $30 per month —depending on the type of connection you have (SLIPs and PPPs cost more)—for a specified number of hours of Internet connect time.

If your provider is outside your calling area, don't forget to add your long-distance charges. You may also need a hardware or software investment to truly enjoy the fruits of the Net.

What Kind of Hardware And Software?

You'd rather not bicycle along in the middle of the interstate. Likewise, on the information highway, your trusty old 2400-bps modem may not be fast enough.

Net users tend to play around with longer files and many more messages than do those on a BBS. You'll want to buy at least a 14,400-bps modem (less than $100 for careful shoppers), if not a 28,800-bps (maybe $50 or $75 more). Poke along at 2400 bps if you must, but remember, if your provider is charging you for time, you'll actually save money at 14,400 bps.

Your reliable DOS comm software should work in most cases, but it may not let you zip along at 14,400 bps even if your modem can. You may have to cruise instead at a slower speed—maybe 9600 bps. Also, you'll want to make certain your program offers VT-100 terminal emulation so that you'll be able to see boldface and other formatting amenities on your screen.

One friend gets along fine with {Commo}, a speedy shareware program that can do a good VT-100 act and needs less than 70K on your hard disk.

You can get {Commo} for $40, from Fred Brucker, P.O. Box 141537, Columbus, OH 43214; 614-326-1309.

DOS TIP

SHORTER IS BETTER

When you're working at the DOS prompt, you can save time and keystrokes by substituting a period for the wildcard sequence *.*. For instance, if you want to delete all the files in a directory, you may use:

```
DEL .
```

To make things even shorter, omit the space and type this instead:

```
DEL.
```

Also, when you're changing from one directory to another directory on the same level, type this command:

```
CD..\directory
```

where *directory* is the name of the directory to which you want to move. Suppose, for example, that you're in C:\COMM\UPLOAD and want to move to C:\COMM\DOWNLOAD. Without this trick, you would have to type these two commands to make the move:

```
CD..
CD\DOWNLOAD
```

But you can get there with just one command:

```
CD..\DOWNLOAD
```

—Pete Moyer

FURTHER READING

The Internet for Dummies by John R. Levine & Carol Baroudi (IDG Books Worldwide, 800-762-2974). Clear and funny. You'll be ready in no time for the sequel, **More Internet for Dummies.**

The Internet Business Guide: Riding the Information Superhighway to Profit by Rosalind Resnick & Dave Taylor (SAMS Publishing, 800-428-5331). Yes, you can use the Net for business, but if you aren't careful, you'll be scorched from head to toe by nastygrams, a.k.a. "flame mail." This book will help you avoid common mistakes.

Netiquette by Virginia Shea (Albion Books, 415-752-7666). A guide to politeness on the Internet. Ms. Manners would approve.

Netguide edited by Peter Rutten, Albert F. Bayers III, and Kelly Maloni (Random House Electronic Publishing, 800-733-3000). A wonderful, topic-oriented list of resources available on the Internet and other computer networks.

—D.H.R.

Brucker's Internet address is **fbruck@freenet.columbus.oh.us** (no space between *k* and @).

If you can afford a SLIP or PPP connection, you'll be better off with Windows software, which, on the Internet, tends to be easier to learn and use than DOS equivalents. One of the hottest programs right now is free on the Internet: Netscape, a Web browser from Netscape Communications Corporation. You can get it via FTP at the Internet address **ftp.mcom.com**. It's much better than the original Mosaic for reading Web material; you spend much less time waiting for files to pop up on your screen, as you tour these "e-libraries."

Sophisticated Windows fans can install a new program called TIA, which will let them use Netscape, Mosaic, and other GUI software with a dial-up account. Here's a way to avoid the expense of SLIP or PPP. TIA isn't real SLIP, but it does emulate it. For more information, phone SoftAware at 310-314-1466. Get a Net-smart friend to help you with TIA.

For the bare-bones version, you'll spend just $25. For an easier-to-break-in version, try the $60 TIA package; it may still stump the totally nontechnical user, but it's far less of a challenge.

Although Windows may be the future on direct connections, one DOS shareware program, Minuet,

AN INTERNET SAMPLER

NEWSGROUPS

comp.os.msdos.apps: Information on DOS application programs.

comp.os.msdos.misc: Miscellaneous subjects relating to DOS.

comp.os.msdos.mail-news: Programs for reading mail and news under DOS.

comp.os.msdos.programmer: Information on the ins and outs of DOS programming.

comp.os.msdos.msdos.4dos: Information on 4DOS, the shareware command processor from JP Software.

comp.binaries.ibm.pc: A wealth of freeware and shareware programs.

comp.internet.net-happenings: One of the best ways to keep up with new services on the Net.

alt.business: Topics range from foreign-exchange rates to health care for the self-employed. This is where some people look for investors and partners. Remember, meeting people on line is no different from meeting strangers in the street. Check out references.

alt.activism, alt.motherjones, alt.fan.rush-limbaugh: Politically related newsgroups.

HUNTING WITH GOPHERS

- **Want to peruse an index to interesting and useful services on the Internet?** Gopher to **gopher.uwm.edu.** Choose Remote Information Servers, then Special Internet Connections.
- **Need the full text of a Supreme Court decision?** Gopher to **info.umd.edu.** Choose Educational Resources, then United States, then Supreme Court.
- **Are you politically active?** Check out EnviroGopher at **envirolink.hss.cnu.edu.**
- **Want to hang out at The Electronic Newsstand?** It's full of freebie articles from *The New Yorker, The National Review*, and other popular magazines. Type **gopher gopher.internet.com.**

TIPS ON THE WORLD WIDE WEB

- **Netscape**—available for Windows and other systems—is *the* program to use when navigating the World Wide Web. It's much faster than the original version of Mosaic, the graphical software that popularized the Web. Better programs than Netscape may appear, of course—but, as of this writing, it's the winner.
- One of the more-thorough ways to search the Web is a program called **Lycos.** It doesn't run on your computer, but rather on machines at Carnegie Mellon University. For more information, go to this location on the Web: **http://lycos.cs.cmu.edu/.**
- Contrary to myth, you don't need SLIP/PPP to use the Web. See whether your provider's system is running **Lynx**, a Web browser that many owners of older computers will appreciate. Lynx works with software that can emulate VT-100 terminals.

—D.H.R.

stands out in the SLIP world. It offers electronic mail, Gopher, Telnet, FTP, and a program to read Usenet news. Minuet's big advantage over regular DOS software is that if you're on a SLIP or PPP connection to the Net, you can write material directly to your hard drive rather than download it from your Internet provider.

Moreover, you can paste material from one application to another. With Minuet, you can take a message from Usenet, for example, and insert it into a letter you're writing.

SOMEWHERE OUT THERE

A Representative Sampling of Internet Providers by State and Province

You probably won't find them in your phone book, but nearly every state and Canadian province now offers direct provider services to the Internet. Some states have more than one, and the list is growing rapidly. No matter where you live, call ahead first to ask about fees and to verify the services listed.

In the sampling from the Public Dialup Internet Access List (PDIAL) that follows, *dialup* refers to access via modem. Entries *DOS World* lists for states with more than one provider (California, for example) were chosen based on broadest local access and quantity of services offered.

For an up-to-date listing of providers in the United States and Canada (plus some overseas), contact PDIAL via e-mail. Send your mail containing the phrase "Send PDIAL" to **info-deli-server@netcom.com**. To get on a list to receive future editions of PDIAL, send e-mail containing the phrase "Subscribe PDIAL" to **info-deli-server@netcom.com**.

ALABAMA <<nuance>> Nuance Network Services. **Dialup:** call 205-533-4296 for number. **Local access:** Huntsville. **Services:** shell (Unix SVR4.2), FTP, Telnet, Gopher, SLIP, PPP, ISDN.

ALASKA <<alaska.edu>> University of Alaska Southeast, Tundra Services. **Dialup:** 907-789-1314. **Local access:** All Alaskan sites with local UACN access (Anchorage, Barrow, Fairbanks, Homer, Juneau, Keni, Ketchikan, Kodiak, Kotzebue, Nome, Palmer, Sitka, Valdez). **Services:** statewide UACN mail, Usenet, Gopher, Telnet, FTP.

ARIZONA <<evergreen>> Evergreen Communications. **Dialup:** 602-955-8444. **Voice:** 602-955-8315. **Local access:** statewide. **Services:** FTP, Telnet, Gopher, WAIS, Archie, WWW, UUCP.

CALIFORNIA <<dial-n-cerf>> DIAL n' CERF or DIAL n' CERF AYC. **Dialup:** Contact for number, 800-876-2373 or 619-455-3900. **Local access:** Los Angeles, Oakland, San Diego, Irvine, Palo Alto, Pasadena. **Services:** shell, menu, IRC, FTP, Hytelnet, Gopher, WAIS, WWW, terminal service, SLIP.

COLORADO <<csn>> Colorado SuperNet Inc. **Dialup:** call 303-273-3471 for number. **Local access:** Alamosa, Boulder, Denver, Colorado Springs, Durango, Fort Collins, Frisco, Glenwood Springs, Aspen, Grand Junction, Greeley, Gunnison, Pueblo, Telluride, anywhere 800 service is available. **Services:** shell or menu, UUCP, SLIP, 56K, ISDN, T1, FTP, Telnet, IRC, Gopher, WAIS, domains, anonymous FTP space, e-mail to fax.

CONNECTICUT <<jvnc-tiger>> John von Neumann Computer Network: Dialin' Tiger. **Dialup:** call 800-35-TIGER for number. **Local access:** Bridgeport, New Haven, Storrs. **Services:** FTP, Telnet, SLIP, feeds, optional shell.

DELAWARE <<ssnet>> Systems Solutions. **Dialup:** call 302-378-1386 or 800-331-1386 for number. **Local access:** Wilmington. **Services:** shell, UUCP, SLIP, PPP, FTP, Telnet, IRC, Gopher, Archie, Mud, etc.

FLORIDA <<gate.net>> CyberGate Inc. **Dialup:** 305-425-0200. **Voice:** 305-428-GATE. **Local access:** South Florida, expanding statewide. **Services:** shell, UUCP, SLIP/PPP, leased, Telnet, FTP, IRC, Archie, Gopher, etc.

GEORGIA <<crl>> CR Laboratories Dialup Internet Access. **Dialup:** 415-389-UNIX. **Voice:** 415-381-2800. **Local access:** Atlanta metro area (also San Francisco Bay area, San Rafael, Santa Rosa, Los Angeles, and Orange County in California, and Phoenix, Scottsdale, Tempe, and Glendale in Arizona). **Services:** shell, FTP, Telnet, feeds, SLIP, WAIS.

ILLINOIS <<InterAccess>> InterAccess. **Dialup:** 708-671-0237. **Voice:** 800-967-1580. **Local access:** Chicago metro area. **Services:** FTP, Telnet, SLIP/PPP, feeds, shell, UUCP, DNS, FTP space.

KANSAS <<delphi>> Delphi. **Dialup:** 800-365-4636 'JOINDELPHI password: INTERNETSIG'. **Voice:** 800-544-4005. **Local access:** Kansas City (also Boston, MA). **Services:** FTP, Telnet, feeds, user groups, wire services, member conferencing.

LOUISIANA <<sugar>> NeoSoft's Sugar Land UNIX. **Dialup:** 713-684-5900; voice 713-438-4964. **Local access:** New Orleans (also Houston, TX, metro area). **Services:** BBS, shell, FTP, Telnet, IRC, feeds, UUCP.

MARYLAND <<express>> Express Access (a service of Digital Express Group). **Dialup:** 301-220-0462, 410-766-1855, 703-281-7997, 714-377-9784, or 908-937-9481. **Voice:** 800-969-9090 or 301-220-2020. **Local access:** Baltimore (also northern Virginia, Washington, D.C., New Brunswick, NJ, Orange County, CA). **Services:** shell, FTP, Telnet, IRC, Gopher, Hytelnet, WWW, Clarinet, SLIP/PPP, Archie, mailing lists, autoresponders, anonymous FTP archives.

MASSACHUSETTS <<novalink>> NovaLink. **Dialup:** 800-937-7644 'new' or 'info', or 508-754-4009, 2400, 14400. **Voice:** 800-274-2814. **Local access:** Worcester, Best of all, for many users, Minuet can run on a slow-poke PC with just 512K of RAM.

You'll find Minuet at the Internet address **boombox.micro.umn .edu.** (The directory is **/pub/pc/minuet.**) As of this writing, the license fee is $50 per user.

Another way to obtain a copy is to buy *The PC Internet Tour Guide: Cruising the Internet the Easy Way* (Ventana Press, 919-942-0220; $24.95), an excellent disk-and-book package by Michael Fraase, who explains how to set up Minuet. ■

Cambridge, Marlboro, Boston. **Services:** FTP, Telnet, Gopher, shell, IRC, XWindows, feeds, adult, user groups, FAX, Legends of Future Past.

MICHIGAN <<michnet>> Merit Network Inc.: Michnet Project. **Dialup:** call 313-764-9430 for number. **Local access:** statewide (also Boston, MA, and Washington, D.C.). **Services:** Telnet, SLIP, PPP, outbound SprintNet, Autonet, Ann Arbor dialout.

NEW HAMPSHIRE <<MV>> MV Communications Inc. **Dialup:** call 603-429-2223 for number. **Local access:** many communities statewide. **Services:** shell, FTP, Telnet, Gopher, SLIP, e-mail, feeds, DNS, archives, etc.

NEW JERSEY <<jvnc-tiger>> John von Neumann Computer Network: Dialin' Tiger. **Dialup:** call 800-35-TIGER for number. **Local access:** Princeton, Newark. **Services:** FTP, Telnet, SLIP, feeds, optional shell.

NEW YORK <<mindvox>> MindVOX. **Dialup:** 212-989-4141 'mindvox' 'guest'. **Voice:** 212-989-2418. **Local access:** New York City. **Services:** conferencing system, FTP, Telnet, IRC, Gopher, Hytelnet, archives, BBS.

NORTH CAROLINA <<Vnet>> Vnet Internet Access Inc. **Dialup:** 704-347-8839, 919-406-1544, or 919-851-1526 'new'. **Voice:** 704-374-0779. **Local access:** Charlotte, Raleigh, Durham, Chapel Hill, Winston-Salem, Greensboro. **Services:** shell, FTP, Telnet, Hytelnet, IRC, Gopher, WWW, WAIS, Usenet, Clarinet, NNTP, DNS, SLIP/PPP, UUCP, POPmail.

OHIO <<OARnet>> OARnet. **Dialup:** send e-mail to nic@oar.net. **Voice:** 614-292-8100. **Local access:** Columbus, Cincinnati, Cleveland, Dayton. **Services:** e-mail, FTP, Telnet, newsfeed.

OREGON <<teleport>> Teleport. **Dialup:** 503-220-0636 (2400) or 503-220-1016 (v.32, v.32 bis) 'new'. **Voice:** 503-223-4245. **Local access:** Portland, Beaverton, Hillsboro, Forest Grove, Gresham, Tigard, Lake Oswego, Oregon City, Tualatin, Wilsonville. **Services:** shell, FTP, Telnet, Gopher, Usenet, PPP, WAIS, IRC, feeds, DNS.

PENNSYLVANIA <<PREPnet>> PREPnet. **Dialup:** call 412-268-7870 for numbers. **Local access:** Philadelphia, Pittsburgh, Harrisburg. **Services:** SLIP, terminal service, Telnet, FTP.

RHODE ISLAND <<anomaly>> Anomaly: Rhode Island's Gateway to the Internet. **Dialup:** 401-331-3706 (v.32) or 401-455-0347 (PEP). **Voice:** 401-273-4669. **Local access:** Providence (also Seekonk, MA). **Services:** shell, FTP, Telnet, SLIP.

TEXAS <<nuchat>> South Coast Computing Services Inc. **Dialup:** 713-661-8593 (v.32) or 713-661-8595 (v.32bis). **Voice:** 713-661-3301. **Local access:** Houston metro area. **Services:** shell, FTP, Telnet, Gopher, Usenet, UUCP feeds, SLIP, dedicated lines, domain name service, full-time tech support.

VIRGINIA <<wyvern>> Wyvern Technologies Inc. **Dialup:** 804-627-1828 or 804-886-0662. **Voice:** 804-622-4289. **Local access:** Norfolk, Virginia Beach, Portsmouth, Chesapeake, Newport News, Hampton, Williamsburg. **Services:** shell, menu, FTP, Telnet, UUCP feeds, IRC, Archie, Gopher, UPI news, e-mail, DNS, archives.

WASHINGTON <<eskimo>> Eskimo North. **Dialup:** 206-367-3837 300/14.4k; 206-362-6731 for 9600/14.4k; 206-742-1150 World Blazer. **Voice:** 206-367-7457. **Local access:** Seattle, Everett. **Services:** shell, FTP, Telnet.

WASHINGTON, D.C. <<tmn>> The Meta Network. **Dialup:** call 703-243-6622 for numbers. **Local access:** Washington, D.C., metro area. **Services:** caucus conferencing, e-mail, shell, FTP, Telnet, BBS, feeds.

ALBERTA <<PUCnet>> PUCnet Computer Connections. **Dialup:** 403-484-5640 (v.32 bis) 'guest'. **Voice:** 403-448-1901. **Local access:** Edmonton and surrounding communities. **Services:** shell, menu, FTP, Telnet, Archie, Gopher, feeds, Usenet.

BRITISH COLUMBIA <<UUNET-Canada>> UUNET Canada Inc. **Dialup:** call 416-368-6621 for numbers. **Local access:** Vancouver (also Toronto, Ottawa, Kitchener/Waterloo, London, Hamilton, Montreal, and Calgary). **Services:** terminal access to Telnet, UUCP (e-mail/news), SLIP/PPP (shared or dedicated).

ONTARIO <<hookup.net>> HookUp Communication Corp. **Dialup:** call 519-747-4110 for number. **Local access:** province of Ontario. **Services:** shell or menu, UUCP, SLIP, PPP, TP, Telnet, IRC, Gopher, domains, anonymous FTP space.

QUEBEC <<CAM.ORG>> Communications Accessibles Montreal. **Dialup:** 514-931-7178 (v.32 bis) or 514-931-2333 (2400 bps); voice 514-931-0749. **Local access:** Montreal, Laval, South Shore, West Island. **Services:** shell, FTP, Telnet, Gopher, WAIS, WWW, IRC, feeds, SLIP, PPP, AppleTalk, fax gateway.

CHOOSING A TAPE DRIVE

Back It Up, Nice and Easy

It's time to stop flipping floppies. Large capacity, low cost, and ease of use mean that dependable data security from a tape drive is now within your reach.

by Robert L. Hummel

It seems laughable now, but just a few years ago, the size of the average hard drive was 40MB. Backing up a 40MB hard disk to floppies was a little inconvenient, but you could do it. Today, you'd be hard-pressed to find a new system sporting a disk smaller than 300MB—and a 500MB minimum is just around the corner.

Do you doubt that backing up to floppies just isn't practical anymore? Consider that a 500MB stack of 1.44MB disks would be just over four and a half feet tall!

Fortunately, recent price cuts for tape drives have brought better technology within the reach of most PC users.

Change for the Better

As recently as a few years ago, a typical tape drive cost $1000 or more. A single tape could hold only 60MB of data, and the mandatory controller card used up a precious expansion slot. In general, the tape drive cost too much, was used too infrequently, and had little relevance to generalized computing chores.

Under those conditions, I often argued that buying a tape drive to back up the average single-user, stand-alone PC was a waste of resources. And I stood by my position, backing up dutifully to floppies every day.

Today, the picture is quite different. The average tape drive is much smaller; instead of occupying desk space, an internal drive will fit into the same size slot as a 3.5-inch floppy drive.

But while its physical size has decreased, the newer drive's tape capacity has grown. Even a low-capacity tape can now hold at least 120MB of data (250MB using data compression). Although you can add a dedicated controller to boost backup speed, most internal drives will work fine by piggybacking onto your floppy-drive controller.

Best of all, tape-drive prices have finally dropped to the point where it's an affordable investment for just about every PC user.

Since even the best tape-backup system in the world will be worthless if you don't use it, it makes sense to get one that's suited to your needs. You'll have to make choices about the drive's capacity, interface, installation requirements, software, and price. But despite the number of choices available, it's not difficult to find just the right drive.

A Tale of the Types

Tape technology can be divided roughly into three categories: too old (and, therefore, obsolete), too new (and, therefore, too expensive), and just right. The two dominant standards in the "just right" category are DAT (digital/analog tape) and QIC-80 (quarter-inch cartridge). You'll hear a lot of praise for DAT drives—and rightly so. A typical DAT drive can back up as much as 4GB of data on a single tape. But DATs' $1200 price tag puts them outside the range of many users.

QIC-80 tape drives, on the other hand, offer moderation in storage

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Contributing Editor Robert L. Hummel is the author of PC Magazine's Programmer's Technical Reference: The Processor and Coprocessor *and* PC Magazine Assembly Language Lab Notes *(both from Ziff-Davis Press).*

If you need to back up more than one computer, APS Technologies' MobilStor Tape250 ($229.95; 800-677-3628) may be the drive for you. Simply plug it into the parallel printer port and load the backup software, and you've got a capacity of up to 250MB (with data compression).

capacity and price. Using a DC-2120 tape, a QIC-80 drive can store up to 120MB of data. If your backup software uses data compression (the same type of system DoubleSpace employs), you can boost the tape's capacity to as high as 250MB.

Prices for a 250MB QIC-80 drive range from about $160 to $299, depending on the configuration. Although older QIC-80 drives are somewhat less expensive, beware: They're limited to 60MB of data (120MB compressed).

Package, Performance, and Price

Assuming you've settled on the QIC-80 format, you'll next need to choose among internal, external, and parallel-port (portable) technologies. Depending on your particular needs and budget, and how fast you need to back up and restore data, one type of drive will be more appropriate than the others.

An *internal* tape drive installs inside your PC in any open drive bay. If you've ever installed a floppy drive, you already know how to install a tape drive. Simply mount it in the bay, connect it to the power supply and floppy-drive controller, and you're ready to safeguard your data.

An internal drive doesn't require a power supply or interface card, so it's the least expensive. Street prices for a 250MB drive hover around $150. Speed, however, is sacrificed. Because the internal tape drive has to move your data through the floppy controller, maximum backup speed is limited to 2MB to 3MB per minute.

An *external* tape drive offers better backup speed, but at the expense of economy and system resources. Unlike an internal drive, an external doesn't use the floppy controller to read and write data. Instead, it connects to your PC via a dedicated interface card, providing backup speeds as high as 9.3MB per minute.

The added costs of the controller card, external case, separate power supply, and connecting cable raise the price of a 250MB external drive to about $250. But if backup speed is your primary concern, and you have a free slot for the controller card, an external drive could be a good solution. (For a caveat, see the sidebar, "Installing Your Tape Drive," below.)

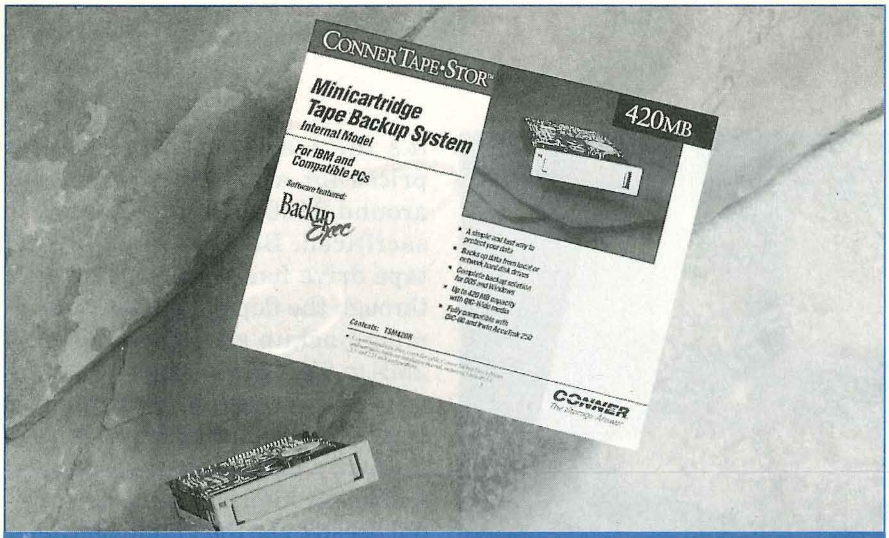
INSTALLING YOUR TAPE DRIVE

For the ultimate in easy tape-drive setup, select a *parallel-port* drive, which connects to your computer's parallel printer port. Simply hook up the drive's cable to your PC, then connect your printer to the socket on the drive. You'll have access to the tape drive, and your printer will still function normally.

Adding an *external* tape drive is fairly simple, but may be frustrating if your PC is already crammed with cards. In theory, an external drive requires only that your PC contain a free slot into which to plug the controller card. But if you already have network, scanner, mouse, and sound cards—all of which require configuration—adding a tape-interface card can complicate matters. You may find yourself debugging those dreaded interrupt (IRQ) conflicts.

An *internal* drive that uses a dedicated controller card is subject to the same cautions as the external drive—with one exception. Though you'll sacrifice backup speed, you can avoid the problems associated with the controller card by attaching the internal drive to your floppy controller. You'll need a free drive bay to house the internal tape drive, and, more importantly, the patience and manual dexterity to install it if yours is one of the smaller PC cases. Make sure the drive you select connects piggyback-style so that you can connect two floppy drives and the tape drive in the same system.

—R.H.



The Conner Tape Products Group (800-626-6637) offers the Tape Stor 420 in internal floppy-interface and external parallel-port versions. The internal model ($199), shown here, boosts compressed disk capacity to 420MB and the backup rate to 9.5MB per minute.

Although it sits outside your PC, an external drive can't wander any farther than the length of its cable. If you need true portability, a *parallel-port drive*, which connects to your PC's parallel printer port, would be a good choice.

The average parallel port isn't designed for bidirectional data transfer, but it's no slouch when it comes to moving data along. Backup rates of 8MB per minute are typical.

You can move a parallel-port drive easily across the room or across the country, making it ideal for installations with more than one PC. I use this type of drive with an ordinary printer switch to provide backup capability for four PCs. It also offers a backup solution for my laptop computer, for which neither an internal nor an external drive would work. Parallel-port drives are the most-expensive configuration, costing about $300.

Software with Clout

There's more to a tape drive than just looks. When selecting your drive, be sure to ask about the software included. The best software will be easy to use, well documented, and adaptable to your work habits. At minimum, it should support three automatic backup options: full (all files), incremental (altered files), and differential (files altered since the last full backup). It should also include support for creating macros to automate backup of different groups of files and directories.

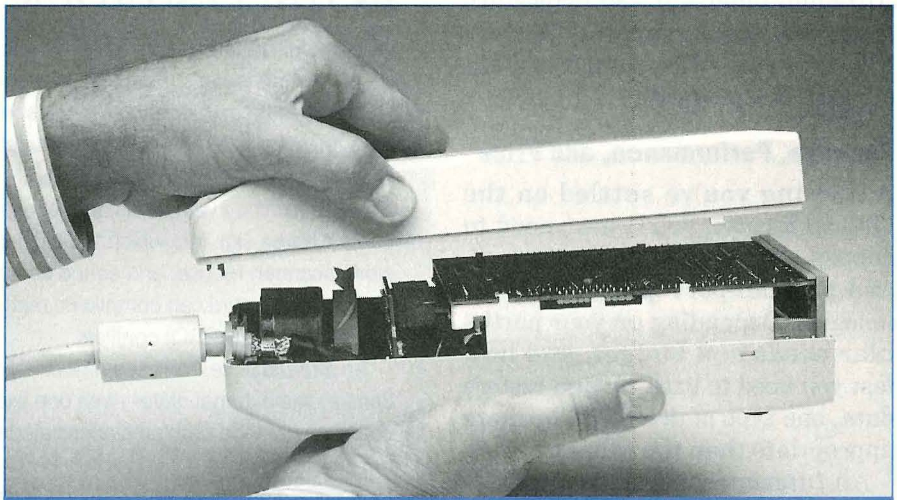
If you choose an internal or external drive, you may be able to use alternative software. The Norton Backup (Symantec, 800-441-7234 or 408-253-9600; $149), PC Tools Pro (Central Point Software, 800-445-4208 or 503-690-8090; $179.95), and even IBM's PC DOS 6.3 (800-342-6672; $89; upgrade $59.95) contain backup programs that will work with most of the standard QIC-80 tape drives.

Because of the unique nature of parallel-port drives, you'll probably be stuck with the software included by the manufacturer. Most tape-backup software supplied with these units is designed to run under DOS. If you're using Windows or OS/2, be sure to ask about programs for those operating systems.

If you're thinking of buying via mail order, note that some of the tape drives advertised are made by the same manufacturer and then relabeled. Here's a rule to live by when ordering by mail: Get the best price, but make sure you get all the correct software.

The Simple Solution

Once you realize that your data is your most valuable asset, choosing and using a tape drive becomes an easy decision. It's time to stop flipping floppies. A tape drive's large capacity, low price, and ease of use can put dependable data security at your fingertips. ■



A capacity of up to 340MB (with compression) and a transfer rate of 9.3MB per minute can be yours with Colorado Memory Systems' Jumbo 350 (800-845-7905).The internal system ($207) converts easily to an external model with Colorado's snap-on housing kit (shown here, $64 for the case, $95 for case plus card).

UTILITIES SOURCEBOOK

Striking Gold in DOS Support Programs

The Norton Utilities and PC Tools Pro are already two of the most popular DOS enhancement packages. But with a little digging, you'll unearth even more gems that can serve you well in emergencies and boost your day-to-day productivity.

Inside The Norton Utilities 8.0

by Lenny Bailes

Several longstanding features of The Norton Utilities (Symantec Corporation, 800-441-7234 or 408-253-9600; $179), such as the ability to undelete recently erased files and to convert floppies to bootable system disks, have been incorporated into recent versions of DOS.

But those enhancements only scratch the surface of what Norton can offer. With a little probing, you'll find plenty of worthwhile features DOS can't match:

- storing and recovering CMOS and partition information
- automatic repair of FAT and directory structures
- low-level calibration and repair of bad disk sectors
- alphabetical sorting of directories
- file and text retrieval
- enhanced batch and command-line capabilities in the NDOS command shell.

Here's how you can benefit from some of the powerful features embedded within Norton's various productivity programs.

Lenny Bailes is a teacher, consultant, and free-lance computer journalist. He lives in San Francisco.

TIP #1: NDOS IS SMARTER THAN DOS

The Norton Utilities' NDOS command shell, a substitute for DOS's COMMAND.COM, lets you use all the regular DOS command-line options plus several other useful enhancements. In addition, it provides a more intelligent use of DOS wildcard characters.

Have you ever tried to use the * (asterisk) character in the middle of a DOS filename to do an intelligent directory listing? It doesn't work. If you type the command `DIR C:\*to*` for a listing of all files that contain the letter string *to*, DOS will display every file in the directory, including those that don't contain the string. With NDOS, however, if you type `DIR C:\*to*`, it will display only those files that contain the specified text string.

NDOS also offers a more-intelligent "change directory" command than DOS. Type `CDD`, and NDOS will specify the directory and drive letter in a single command.

In DOS, for example, if you're logged into drive C, you can't just enter the command `CD D:\WP51`. First, you must change the drive letter from `C` to `D`, press Enter, and then type `CD \WP51`. The NDOS `CDD` command, however, lets you do it all in one step:

```
C:\CDD D:\WP51
```

You can load NDOS temporarily from the command line by changing to the NU directory and typing NDOS, or you can make it your permanent command processor by entering this statement in CONFIG.SYS:

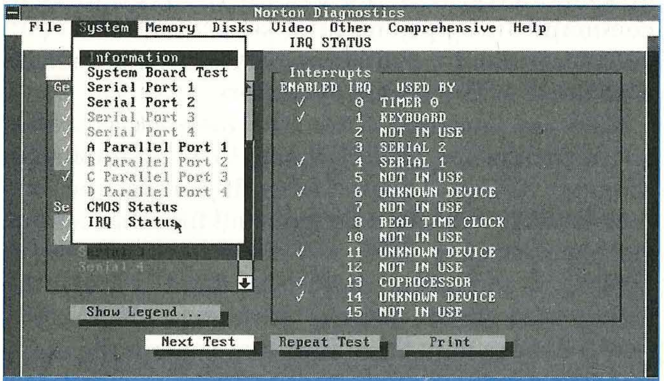
```
SHELL= [d:]\NU\NDOS.COM [d:]\NU
```

NDOS's intelligent use of wildcards, CDD, and other built-in enhancements greatly simplifies batch-file construction and file maintenance. Once you've loaded the command shell, simply press F1 to bring up a complete listing of all its enhanced feature options.

TIP #2: NDIAGS, TROUBLESHOOTER EXTRAORDINAIRE

If you're thinking of installing a sound card, a CD-ROM drive, an internal fax modem, or multiple serial ports in the same system, Norton's NDIAGS may save you a headache or two.

Commonly, when users install multiple peripherals, conflicts arise that prohibit one or more devices from working properly: Modems won't dial, sound cards won't play, and so on. For multiple peripherals to coexist happily, each one must have a unique port address and IRQ ("hard interrupt") assignment. The setup software and DIP switches on the cards typically ask you to specify an individual IRQ for each device. The problem, however, is how to know which ones are available and which are already in use by the system. That's where NDIAGS comes to the rescue: It will save you the trouble of rebooting and resetting the system by trial-and-error.



```
IRQ STATUS
Interrupts
ENABLED IRQ   USED BY
   ✓      0   TIMER 0
   ✓      1   KEYBOARD
          2   NOT IN USE
          3   SERIAL 2
   ✓      4   SERIAL 1
          5   NOT IN USE
   ✓      6   UNKNOWN DEVICE
          7   NOT IN USE
          8   REAL TIME CLOCK
         10   NOT IN USE
   ✓     11   UNKNOWN DEVICE
         12   NOT IN USE
   ✓     13   COPROCESSOR
   ✓     14   UNKNOWN DEVICE
         15   NOT IN USE
```

Norton's System menu offers an IRQ Status option, which can determine and report on your PC's interrupt-request assignments.

The Hardware Configuration option on the NDIAGS File menu will display a list of installed peripherals and the port addresses in use by each one. For example, if your sound card offers a choice among addresses 220, 240, 320, and 340 hex, the hardware configuration display will tell you whether these ports are available or in use.

The IRQ Status option on the System menu will poll and test your system to determine which IRQs are currently in use. (When the option for loop-back testing pops up for your serial and parallel ports, choose Skip from the menu.)

After you run the IRQ Status test, a list of the interrupts from 1 to 15 will appear, showing which are taken and which are free. (See the accompanying screen shot, below left.)

The test will also reveal whether your serial ports or other peripherals are misconfigured and, therefore, attempting to use the same IRQ. To avoid conflicts, install and assign IRQs to your peripherals one by one, using the NDIAGS information to eliminate duplications.

TIP #3: A PERFECT HARD-DISK IMAGE

Most Norton users are aware that the Image program will save a snapshot of your hard disk's file-allocation and directory structure. The Norton setup option lets you specify that your system run Image automatically from your AUTOEXEC.BAT file each time you boot up. But what if something goes amiss with your computer between the time you shut it off and the next time you turn it on?

Perhaps you've changed the disk-controller card or installed a new hardware peripheral between sessions, or someone has turned the machine on and changed a configuration item without your knowledge. You may find that the system fails during the boot process, or that some unexpected command from AUTOEXEC.BAT scrambles your hard disk. And, if you perform all your Image backups from AUTOEXEC.BAT, the last Image record on your hard disk will preserve information from the beginning of your last session, instead of tracking the work you did during that session. What's worse, if something has gone wrong with the hard disk in the interim, Image may run from your AUTOEXEC.BAT and replace the good information you saved with a new, faulty record of your hard-disk structure.

To buy yourself more data protection, consider running the Image utility at the end of a work session, right before you shut off the system. If you want to play it really safe, run Image twice—at the beginning and at the conclusion of a work session. All you need to do is construct a SHUTDOWN batch file containing statements similar to the ones Norton inserts into your AUTOEXEC.BAT:

```
SHUTDOWN.BAT
IMAGE C
IMAGE D
IMAGE E
...
```

If you need to search for deleted files or do an emergency unformat of your hard drive, Norton will save the last two instances of the Image data.

TIP #4: TRACKING DOWN ELUSIVE DATA

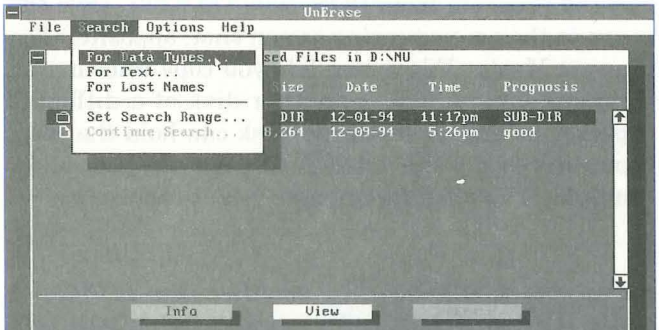
The Norton UnErase program can do more than simply present you with a screen display of your most recently deleted files. If you've misplaced a file and don't see it listed, you can use the UnErase Search menu to run through every sector of your hard disk in pursuit of elusive data.

A Data Types option (see the screen shot, below) lets you request a search for clumps of ASCII text, or strings of data resembling Lotus 1-2-3, Symphony, or dBASE files, when they don't show up in the basic UnErase file-recovery list. (An Other Data option will also search for file fragments that may be part of executable programs or binary data files.)

Norton's Text option on the UnErase menu lets you search the hard disk only for occurrences of a specific text string. A Lost Names option looks for deleted files in deleted directories that the program couldn't detect in the basic UnErase screen.

For instance, if you know you had an important letter to your father on the disk, you can use the Search/For Text option by typing in his name or a specific phrase you remember from the letter. If you're looking for an address list, you can search for dBASE III or IV filetypes. When the search is finished, UnErase will display a list of "found files" so that you can view their contents and attempt a recovery.

Sometimes you may need to recover part of a WordPerfect, Lotus, Symphony, Excel, dBASE, or Quattro Pro file that refuses to open. You know the data is there, but the file header or something else in the file has become corrupted. In that case, Norton's File Fix utility may be able to repair it so that your application can load it again. File Fix can attempt an automatic repair of these binary data types, and also let you "adjust" spreadsheets and database files so that data entries and records are formatted correctly.



```
 DIR    12-01-94  11:17pm  SUB-DIR
8,264   12-09-94   5:26pm  good
```

Norton's UnErase provides a search feature with three options: Data Types (ASCII, Lotus, Symphony, or dBASE), Text (a specific string), and Lost Names (deleted files in deleted directories).

The basic UnErase file-recovery option will be enhanced considerably if you install the Norton Smartcan utility. Smartcan establishes a hidden directory on your hard disk where deleted files are archived for a specified number of days. Installing Smartcan may save you the time and trouble of using the advanced UnErase and File Fix features.

TIP #5: RECLAIMING THE UNRECLAIMABLE

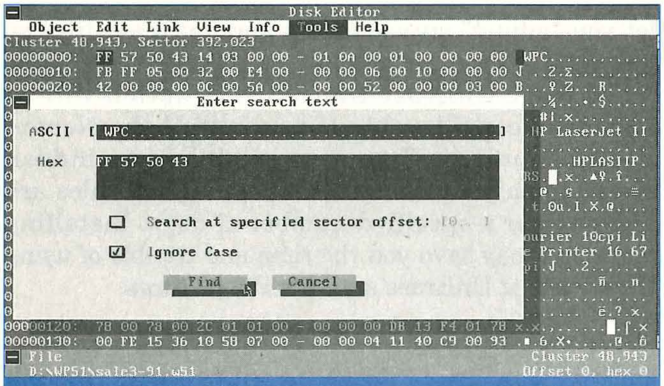
In addition to Norton Disk Doctor's standard options for examining and repairing a corrupted hard disk, there's a special option you can use when your system can't find your hard disk at all. If you ever discover that the system can't locate your C drive, or that other drive letters are missing, run Disk Doctor with the Rebuild option to recover lost partition information.

Disk 2 of The Norton Utilities installation set is a special emergency disk containing recovery tools in nonarchived, usable format. You can run UnFormat, UnErase, Norton Disk Doctor, and Disk Editor by booting from a floppy, then inserting Norton Disk 2 into the drive. When the system can't find your C drive (or other drive letters), type `NDD/Rebuild`. Chances are Disk Doctor will be able to restore your lost drive letters. (If you have a recent Norton Rescue Disk, you can also use it to restore the master boot record and partition information. If you've changed your hard-disk setup or switched controller cards after the Rescue Disk was made, NDD/Rebuild is probably a better option.)

Disk Editor is a world of data recovery in itself. It contains too many features to discuss adequately here, but an important one to note is that it can bypass DOS entirely and read your hard drive sector by sector. That's good to know if you've had a hard-disk crash and can't bring the system back to a state where DOS will recognize the drive. Disk Editor will rescue data before you throw up your hands and feel forced to run FDISK and reformat the disk.

To bypass DOS and access the disk directly, simply run DISKEDIT with its /M (maintenance) option. To search for lost data, use the Find option from the Tools menu. (See the screen shot, page 54.) If you're looking for text, type the text string into the ASCII dialog box and press Enter. Disk Editor will search the drive until it finds that text string.

Write down the cluster and sector setting where the text begins, starting at Disk Editor's status line. Page down through the display until the text ends, and note the ending cluster and sector. You can then rescue this group of clusters and save your text to another drive. Pull down the Object menu again, and press Alt+S for



```
Cluster 48,943, Sector 392,023
00000000:  FF 57 50 43 14 03 00 00 - 01 0A 00 01 00 00 00 00  WPC...........
00000010:  FB FF 05 00 32 00 E4 00 - 00 00 06 00 10 00 00 00 √ ..2.Σ........
00000020:  42 00 00 00 0C 00 5A 00 - 00 00 52 00 00 00 03 00 B...♀.Z...R....
00000120:  78 00 78 00 2C 01 01 00 - 00 00 00 DB 13 F4 01 78 x.x.,......█.⌠.x
00000130:  00 FE 15 36 10 58 07 00 - 00 00 04 11 40 C9 00 93 .■.6.X•......@..ô
D:\WP51\sale3-91.w51                                   Cluster 48,943
                                                       Offset 0, hex 0
```

ASCII [WPC]

Hex FF 57 50 43

☐ Search at specified sector offset:

☑ Ignore Case

Norton's Disk Editor lets you search for lost text, binary data files, or PKZIP files from its Tools menu.

sector. Specify the starting and ending sectors for the block you want to save.

Next, return to the Tools menu and select "Write Object to . . ." and then "to a file . . . ." Choose a filename and type in the path to a floppy drive or to an undamaged hard drive. Disk Editor will dump the sectors you've searched and marked.

You can also use Disk Editor to look for binary data files or PKZIP files. Select the Find option from the Tools menu and type a hexadecimal string into the Hex box. For instance, to look for WordPerfect 5.1 documents, you could first use Disk Editor to inspect a good document on a good drive to determine the hex signature at the beginning of the file. Or you could open a good ZIP file to find its initial hex signature. (The first few characters in hex of a WordPerfect 5.1 document are FF 57 50 43; the first few characters in hex of a PKZIP file are 50 4B 03 04.)

To search for binary filetypes on a damaged hard disk, run Disk Editor, select Find from the Tools menu, and enter the appropriate hex string into the Hex dialog box. If Disk Editor finds the string on your disk, you'll have to page down through all the sectors until you find what looks like the end of the data you're trying to rescue. Sometimes the end of the file will be apparent when you see a series of repeating zeros or ellipsis points (indicating spaces).

On a piece of paper, write down the starting and ending sectors for the block you want to save, then define the block in the Object menu and write it to disk with the Tools menu, as described above.

DOUBLE-DUTY TOOLS

These tips are only some of the "Swiss Army Knife" collection of tools tucked inside version 8.0 of Symantec's Norton Utilities package. Take time to probe and explore, and you'll undoubtedly find still more that will serve you well in those inevitable emergencies—and boost your day-to-day productivity, too.

Inside PC Tools Pro 9.0

by Kay Yarborough Nelson

PC Tools Pro (Central Point Software, 800-445-4208 or 503-690-8090; $99.95) offers all kinds of seldom-tapped programs that go beyond the basic backup/tuneup-and-repair/virus-protection package.

I found several golden nuggets within my copy that are menu driven, even when running from the DOS command prompt instead of the PC Tools Pro desktop. None of them requires much explanation.

TIP #1: A FLOPPY FASTCOPY

FastCopy is a fast disk duplicator that can save floppy-disk images on your hard disk or CD-ROM drive. Since I sell a WordPerfect macros disk by mail, I use this little utility about once a month to replenish my supply of disk copies. I can specify the number of copies I want to make, and verify the format and final copy.

FastCopy makes duplicates quickly and with much less disk swapping than DOS's DISKCOPY command, because you don't have to insert the target disk; you can store its disk image right on your hard disk. To run the program from DOS, type `FASTCOPY`. (See the menu in the accompanying screen shot, opposite.) The Convert Master File option lets you copy information from one floppy disk to another disk of a different capacity, as long as the target disk can hold the data. (You can't copy a full 1.44MB disk to a 720K disk, for example.) The program prompts you at each step.

TIP #2: WIPE IT OUT

Another gem is Wipe, a command that securely erases a disk's contents so that no recovery utility—including PC Tools Pro itself—can get it back. Type `WIPE` at the DOS prompt

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Kay Yarborough Nelson is the author of Voodoo DOS *and* Voodoo Windows *(Ventana Press);* Slick Tricks: WordPerfect for Windows *and* Slick Tricks: Word for Windows *(Random House); and* Lotus 1-2-3 Answers *(Osborne/McGraw-Hill).*

and choose the files, directories, or disks you want to erase. You can wipe files that are older or younger than a specified date, hidden and read-only files, or files that haven't been changed since your last backup.

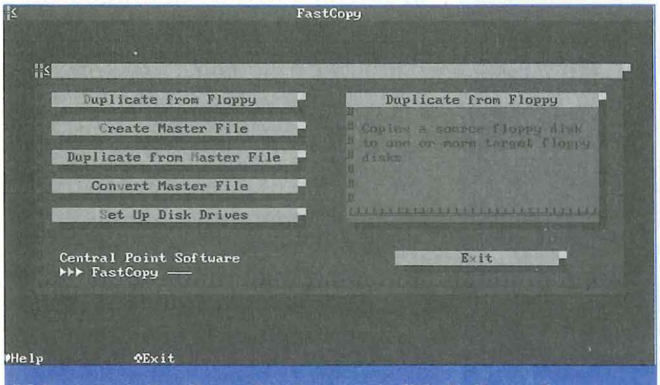
Wipe can either remove the files and write over their spaces with zeros (Fast Wipe), or it can perform a DOD (Department of Defense) wipe, in which it overwrites the erased area at least three times. There's also a Delete Files option that works just like DOS's DEL command, except that hidden and read-only files are included.

Using Wipe takes a little longer than DOS's DEL command, so use it only to erase files and directories you want to keep confidential. I use Wipe when I need to make sure that undeletable tax data doesn't leave home on an erased floppy, and for recycling used disks.

TIP #3: CPR FOR YOUR PC

While continuing to surf the manual and explore on-line help, I found a great utility called CPR, which resuscitates your PC to its last-saved state if the power goes out or your system locks up. *CPR* stands for *Central Point Recuperator*; it watches your system's activity continuously and saves its state periodically. If there's a crash, you can restart your computer and usually get back to the latest state in which your system was saved (you specify how often you want it to save), with your working files open. Since I live in the woods where the electricity goes down nearly every time it gets windy, I installed CPR right away. (CPR loads from your AUTOEXEC.BAT file; it's one of the few utilities in this collection requiring a separate installation.)

You'll need a bit of disk space free to store the CPR image: the total amount of your system and video memory, plus the total sizes of your file-allocation tables, plus 30K of additional space. For example, if you have 8MB of RAM, a 1MB video card, and two FATs that total 64K, add the 30K of required additional space; you'll need a total of 9.1MB available to store the CPR image.



Copies a source floppy disk to one or more target floppy disks

PC Tools Pro's FastCopy utility is a speedy disk duplicator that saves an image of the target disk right on your hard disk.

If you crash while CPR is installed, just reboot and enter `CPR`. The utility will compare its saved FAT with the current FAT and give you the odds for a complete recovery. It won't attempt a recovery if the saved state might damage the current one.

Drawbacks to CPR, however, are that it can't save its image file on a disk that's been compressed by DoubleSpace or Stacker, and you'll be interrupted every so often by tones and beeps as it saves. But if you live in an area where there are frequent power failures, this little utility is worth its weight in gold.

TIP #4: FILEFIX'S DAMAGE CONTROL

PC Tools Pro's FileFix utility recovers damaged data files from certain spreadsheet, database, and word-processing programs. (Most general-purpose utility packages can repair disks; most can identify damaged files; but with the exception of The Norton Utilities and PC Tools Pro, most can't repair damaged files.)

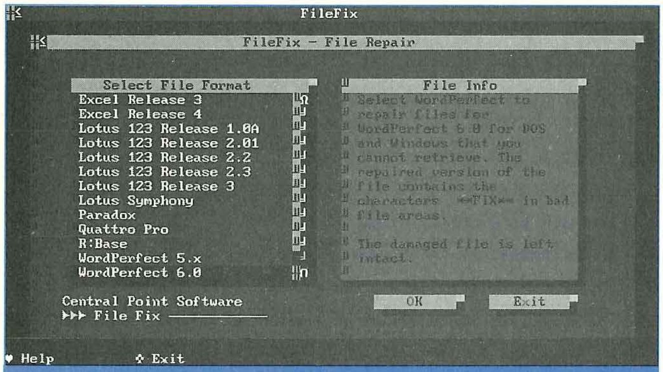
Among spreadsheet programs, FileFix can recover damaged files created by Lotus 1-2-3 (Releases 1.0A, 3, and 3 for DOS, and 1.X for Windows), Excel (Releases 3.0 and 4.0), Quattro Pro for DOS (3.0 and 4.0), Symphony (Releases 1 and 2), and several compatible programs. Databases covered include dBASE II, III, III+, IV, 1.1, and 1.5; Paradox 3.0 and 3.5; Clipper; FoxBase and Fox Pro; and R:Base System V. Word processors that FileFix will rescue are WordPerfect 5.x and 6.0 for DOS and 6.0 for Windows.

FileFix is easy to use. Just enter `FILEFIX` at the DOS prompt and follow the on-screen menus. (See the screen shot, page 56, top left.) Select the file type you want to repair, choose the file you want to fix, and click on OK. FileFix will attempt to fix the file, and will create a new one with the same name and the extension FIX, as well as a port file with an RPT extension showing the changes it made. At worst, you can usually get your text back, even if formatting is lost; at best, you can get everything back, including formatting.

TIP #5: SCHEDULED ROUTINE MAINTENANCE

The PC Tools Pro package includes a scheduler that lets you run unattended maintenance-type tasks, such as daily backups and virus checking. I've set mine up to run at the end of the day, when I'm usually away from the computer. At 7 PM, it scans my hard disk for viruses, runs DiskFix to check the disk integrity, and backs up the day's work to a tape drive.

You can set up PC Tools Pro's schedule of regular tasks when you install it. You'll need to create a setup file for each task, but you can build on PC Tools Pro's DAILY.SET, a setup file for daily backups. The fastest



Select WordPerfect to repair files for WordPerfect 6.0 for DOS and Windows that you cannot retrieve. The repaired version of the file contains the characters ««FIX»» in bad file areas.

The damaged file is left intact.

Prompts and menus make PC Tools Pro's FileFix program easy to use if you're recovering data.

way to configure your own setup file is to load DAILY.SET (choose Load Setup from the PC Tools Pro File menu), and modify it for what you want it to do, such as telling it where to back up (tape drive, network drive, removable, and so on), and whether to scan for viruses.

TIP #6: FILEFIND IF YOU FORGET

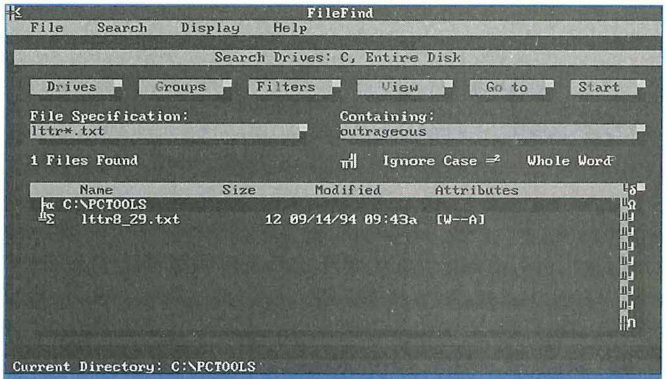
DOS is great for finding files, if you can remember their names or any part of their names. Here's a tip: The command DIR FILESPEC /S, entered from the root directory, will search your entire hard disk, including all subdirectories, for whatever you've specified.

What if you can't remember the filename? I usually can't remember the filename of a letter I wrote a few weeks or even a few days ago. Was my letter to Bill Clinton called LTTR8_26.TXT, LTTR8_27.TXT, or LTTR9_2.TXT? Since I know I used the word *outrageous* in it a couple of times (see the screen shot, right), FileFind can locate that letter quickly—much faster than DOS.

FileFind can also save criteria for groups of files with which you work regularly (such as all the documents, spreadsheets, and graphics pertaining to a particular project), so that you can locate the whole set of files, even though they're stored in different subdirectories on your hard disk. It searches network drives, too.

To run FileFind, all you have to do is enter FF at the DOS prompt, then specify which drives to search. Next, specify the files to locate by filename (using wildcards), extension, or contents (also using wildcards); then specify any criteria to which you may want to restrict the search, such as a specific date of creation or the time span during which the file might have been modified. Finally, choose Search.

When the search is finished, you can view the contents of the found files without starting the application that created them. FileFind can also locate duplications (files with the same name and date), which is handy if you're in the habit of storing copies in various locations.



```
Search Drives: C, Entire Disk
File Specification:          Containing:
lttr*.txt                    outrageous
1 Files Found
   Name            Size     Modified          Attributes
 C:\PCTOOLS
   lttr8_29.txt       12 09/14/94 09:43a  [W--A]
Current Directory: C:\PCTOOLS
```

PC Tools Pro's FileFind module searches your drives for "missing" files according to filename, partial filename, or content.

MORE FOR THE MASTERS

For advanced users, the jewels hidden within PC Tools Pro include a hardware diagnostics program that checks and tests your configuration; measures your disk, CPU, and network performance; and lets you edit your CMOS (system configuration) values. A disk editor for directory, hex, boot-record, FAT, and partition tables lets you view and edit as well as fix disk problems such as damaged files and directories. Other modules monitor drive activity, hide and encrypt files, and manage memory.

The ultimate unexpected tool, if you're on a Novell network, is that you can use PC Tools Pro to broadcast messages to other network users and manage your e-mail.

If you haven't explored PC Tools Pro yet, a few minutes spent tinkering under the hood may reveal some very useful programs for handling your day-to-day computing tasks. ■

DOS TIP

DOSSHELL ADDS UP

When you plan to copy a bunch of files to a floppy disk, you don't have to do a lot of math to figure out whether all the files will fit on the floppy disk; the DOS shell (DOSSHELL.EXE) will tell you. Simply open the appropriate directory, select the files you want to act on, open the Options menu, and select Show Information. The fifth line of the display tells you the number of files you selected; the sixth line lists the number of bytes those files occupy.

Is there enough space? Take a directory of the destination floppy disk, and compare the figure DOS quotes for available space against the figure DOSSHELL reported.

—Jack Nimersheim

SPECIAL EFFECTS IN QBASIC

Opening Might: Playing With Size and Color

Get your QBasic programs off to an impressive start by adding special lettering effects to your introductory screens.

by Jon Mark O'Connor

I make my living writing software. I spend my days—and sometimes my nights—tapping out code, then testing and refining my work. When I'm satisfied that a program does what my client has requested, I like to add one final touch: an opening screen that welcomes users to the program. For a while, my screens consisted of a colorful, centered box containing pertinent details about the software. Then I started thinking about ways to add some pizzazz—and thinking led to tinkering.

Over time, my tinkering evolved into a lettering-effects generator that lets me vary the size of letters, from small to gigantic; produce shadowing; and parlay QBasic's 16 colors into hundreds of different hues. Although I wrote the original program in Quick Basic, the version presented here, LFX.BAS (page 59), is a QBasic program whose simplicity of design makes it easy to create thousands of lettering effects by changing just a few program values. (See the accompanying screen shot, "Lettering-effects sampler," page 58.)

If you like to dabble in QBasic and aren't intimidated by a little typing—or if you have a modem and know how to download files—you can put LFX.BAS to work in your own QBasic programs in a matter of minutes. (See "How to Use This Magazine," pages 78–80 in this issue, for advice on downloading LFX.BAS files from the *DOS World* BBS.)

Because LFX.BAS was designed with modification in mind, you can produce professional-looking screens quickly, by typing in the text you want to display, indicating where to place that text on screen, choosing type size and foreground and background colors, and deciding how much shadowing to add.

Truth in Typing

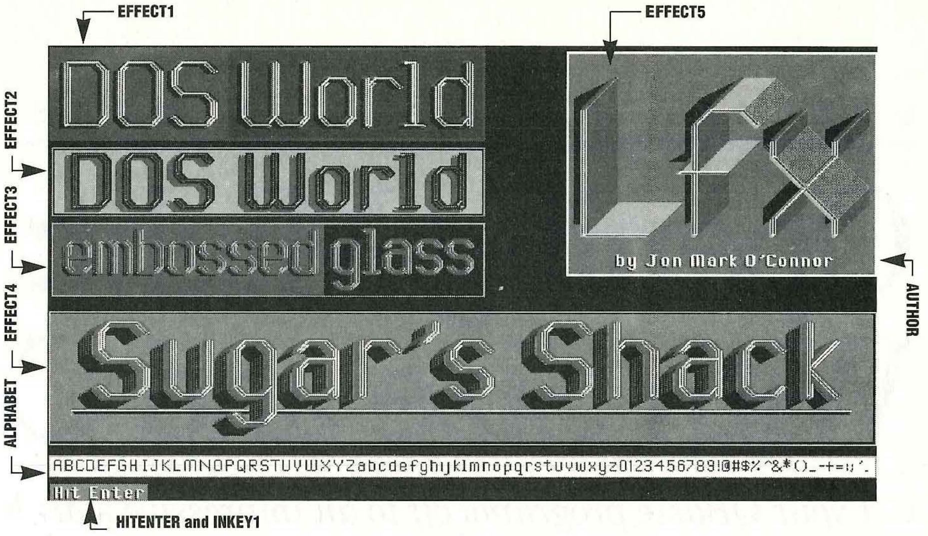
At first glance, the program may look a little long, but if you examine it closely, you'll see that a few lines—56 of them, to be exact—are highlighted in color. After typing in these lines, you'll have a working program, and you can get down to some experimentation. The directions that follow assume that you'll take advantage of this shortcut:

1. First, load QBasic by typing `C:\DOS\QBASIC` at the DOS prompt. (Change the path if you store QBasic in a subdirectory other than C:\DOS.) Then press Esc to clear the opening screen.
2. To ensure that you don't lose any of your work, open the File menu immediately. (Press Alt+F or use a mouse to click on the File option in the menu bar at the top of the screen.) Then name the file by saving it as LFX.BAS. If you want to store it in C:\DOS\QBASIC, for instance, choose Save and type the following in the File Name box that QBasic displays:

```
C:\DOS\QBASIC\LFX.BAS
```

As you type in the listing, periodically choose the File/Save option to update the version of the file on disk.

Jon Mark O'Connor is the president of dj\Systems, a company specializing in software for radio stations. Write to him c/o DOS World*, 86 Elm St., Peterborough, NH 03458. If you'd like to share some of the special effects you create with LFX.BAS, please submit them on a 3.5- or 5.25-inch floppy disk. Enclose a self-addressed, stamped envelope.*



Lettering-effects sampler. These are just eight of the thousands of possible special effects you can create with LFX.BAS.

3. Next, type in the first group of highlighted lines, which are part of the main program. (Here and elsewhere, you may omit all apostrophes and the remarks that follow them.)

4. Then type in this line to tell QBasic to create a subroutine called LAYER1:

```
SUB LAYER1
```

When you press Enter, QBasic will move you to another screen; a title bar under the menu bar displays the name of the program, followed by the name of the subroutine. In the program window, you'll see these lines:

```
DEFINT A-Z
SUB LAYER1

END SUB
```

You typed the second line; QBasic provides the others.

5. Move your cursor to the blank line and add the 12 highlighted PSET commands shown in the listing. To save time, type the first line, then copy it 11 times.

First, highlight the entire line by pressing Shift+down arrow (or dragging the mouse along the command). Then press Ctrl+Insert (or choose the Edit menu's Copy option), move the cursor to the next line, and press Shift+Insert (or choose the Edit menu's Paste option) to paste in the duplicate line.

Then press Shift+Insert ten more times. Edit the duplicate lines as necessary.

Note that some of the lines include a superfluous zero (`PFL + 0`), which you may omit. I included the extra zeros because I wanted to align all elements within the PSET commands.

6. To start the next subroutine, LETTERS, return to the main program by pressing F2 to bring up the Subs dialog box. Highlight the main program, LFX.BAS, press Enter, and type `SUB LETTERS`.

7. Now comes the one hard task: creating the commands that draw the letters. Fortunately, you can get started by typing just the eight highlighted commands: `P$(68)` (*D*), `P$(79)` (*O*), `P$(83)` (*S*), `P$(87)` (*W*), `P$(100)` (*d*), `P$(108)` (*l*), `P$(111)` (*o*), and `P$(114)` (*r*). Check your work carefully.

See the accompanying sidebar, "To the Letter," left, for an explanation of what the various elements of these commands mean.

8. Create the final subroutine, TRANSLATE, by returning to the

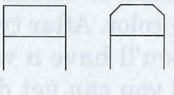
TO THE LETTER

Any way you look at it, typing in the complete list of commands in the subroutine LETTERS is tedious, but your work may go more smoothly if you realize that the letters and numbers between quotation marks provide QBasic with drawing instructions.

To understand how the system works, imagine that you want to tell QBasic to draw an uppercase A. Here's the command:

```
DRAW "U9 R5 D9 U4 L5"
```

U means *up*, R means *right*, D means down, and L means *left*. The numbers indicate how many pixels to move. If you follow these drawing instructions, you get an *A* like the one shown on the left side of the illustration below.



To draw a letter with angled corners, you'd use this command:

```
DRAW "U9 E1 R5 F1 D9 U4 L5"
```

which produces an *A* like the one on the right side of the illustration.

E draws a diagonal line to the right and up; F draws a line to the right and down. Their complements are G and H, which move you left and down and left and up, respectively.

To change position without drawing, precede the command with B. Typing `BR12`, for instance, tells QBasic not to draw anything as it moves 12 positions to the right.

—J.M.O'C.

main program as described earlier, typing `SUB TRANSLATE`, and pressing Enter. Type in the remaining ten highlighted lines.

Note that this QBasic subroutine includes the drawing command for the lowercase letters *i* and *j*. Later on, when you type in the full lettersets, you may save time by copying the sequences from TRANSLATE and pasting them into LETTERS.

You're in Business

Now you're ready to run the program. Press Shift+F5, and if your typing is correct, the word *DOS* will appear in a red box in the top-left corner of the screen. To the right of the red box is a blue box containing the word *World*. The text appears in gold and has shadow, depth, and a hint of shine in the corners of the letters.

Where does the gold come from? It's not one of the colors for screen 9. (See the accompanying table, "Color Attributes," page 60.) Actually, you're seeing an effect achieved by layering.

Let's look at the section labeled EFFECT1 to discover how this hue is produced. The first two lines of this section use LINE commands to draw background boxes; they follow the standard syntax for filled boxes:

```
LINE (X1, X2)-(Y1, Y2), C, BF
```

where X1 is the distance (in pixels) of the box from the left edge of the screen, X2 is the distance from the top of the screen, Y1 is the distance from the right edge of the screen, Y2 is the distance from the bottom of the screen, C is a color value from zero to 15, and BF indicates that the box is filled. (If you use B instead of BF, you create the outline of a box.) In EFFECT1, the first LINE command creates a long red rectangle, and the second one superimposes a smaller, blue rectangle on the red one, leaving a red border two pixels wide on three sides.

The next six lines of the program assign variables:

LFX.BAS lets you create thousands of lettering effects by changing just a few program values. By typing in only the lines highlighted in color, you may quickly produce a short version of the program with which to experiment.

```
 ''''''''''''''''''''''''''''''
 'LFX by Jon Mark O'Connor    '
 '                            '
 ''''''''''''''''''''''''''''''

  DECLARE SUB LAYER1 ()         'You don't need
  DECLARE SUB LAYER2 ()         'to type in these
  DECLARE SUB LETTERS ()        'DECLARE SUBs. They're
  DECLARE SUB NORMAL1 ()        'added when you save
  DECLARE SUB NORMAL0 ()        'the program.
  DECLARE SUB TRANSLATE ()      '

  DEFINT A-Z                    'The program starts here.
  DIM P$(122)
  COMMON SHARED P$(), P$, SIZE$
  COMMON SHARED C1$, C2$, C3$
  COMMON SHARED C4$, BGC, DOT$
  COMMON SHARED SPACING$, WORD$
  COMMON SHARED PFT, PFL
  CALL LETTERS                  'Call letterset.
  SCREEN 9 ''''''''''''''''''''''Set screen mode to 9.

EFFECT1:
  LINE (1, 1)-(338, 72), 4, BF 'Effect background.
  LINE (140, 3)-(336, 70), 1, BF
      WORD$ = "DOS World"      'Word(s) to be converted.
   SPACING$ = "L2" 'L decreases spacing; R increases it.
      SIZE$ = "24" 'Use increments of four, up to half of resolution.
       DOT$ = "N"  'No dot over i and j.
        BGC = 4    'Background color.
   CALL TRANSLATE  'Converts above to a DRAW command.
   C1$ = "C14": C2$ = "C 8": C3$ = "C 0": C4$ = "C15"  'Colors.
   PFT = 52: PFL = 13: CALL LAYER1  'PFT = position from top.
   PFT = 52: PFL = 9:  CALL LAYER1  'PFL = position from left.
   PFT = 51: PFL = 10: CALL LAYER1  'Increase and decrease
   PFT = 51: PFL = 11: CALL LAYER1  'PFT and PFL to create depth.

EFFECT2:
  LINE (3, 78)-(338, 130), 13, B
  LINE (5, 80)-(336, 128), 7, BF
      WORD$ = "DOS World"
   SPACING$ = "L1"
      SIZE$ = "20"
       DOT$ = "N"
        BGC = 7
   CALL TRANSLATE
   C1$ = "C 5": C2$ = "C 8": C3$ = "C 8": C4$ = "C 8"
   PFT = 117: PFL = 17: CALL LAYER1
   PFT = 117: PFL = 15: CALL LAYER1
   PFT = 117: PFL = 13: CALL LAYER1
   C1$ = "C 5": C2$ = "C 0": C3$ = "C 0": C4$ = "C15"
   PFT = 115: PFL = 19: CALL LAYER1
   PFT = 115: PFL = 18: CALL LAYER1

EFFECT3:
  LINE (3, 136)-(214, 192), 8, BF
  LINE (3, 136)-(338, 192), 7, B
      WORD$ = "embossed glass"
   SPACING$ = "L2"
      SIZE$ = "16"
       DOT$ = "N"
        BGC = 8
  CALL TRANSLATE
  C1$ = "C 0": C2$ = "C 0": C3$ = "C 0": C4$ = "C 0"
  PFT = 167: PFL = 12: CALL LAYER1
  C1$ = "C 8": C2$ = "C 7": C3$ = "C15": C4$ = "C 0"
  PFT = 167: PFL = 13: CALL LAYER2
  PFT = 167: PFL = 12: CALL LAYER2
  PFT = 166: PFL = 13: CALL LAYER2
  PFT = 167: PFL = 11: CALL LAYER2

EFFECT4:
  LINE (2, 206)-(636, 303), 12, BF
  LINE (1, 204)-(639, 306), 15, B
  LINE (19, 280)-(620, 280), 14, B
  LINE (20, 281)-(619, 281), 0, B
  LINE (21, 282)-(618, 282), 0, B
     WORD$ = "Sugar's Shack"
  SPACING$ = "L1"
     SIZE$ = "28"
      DOT$ = "N"
       BGC = 12
  CALL TRANSLATE
  C1$ = "C12": C2$ = "C 4": C3$ = "C 0": C4$ = "C 0"
  PFT = 266: PFL = 24: CALL LAYER1
  C1$ = "C12": C2$ = "C 4": C3$ = "C 0": C4$ = "C 0"
  PFT = 265
  FOR XX = 25 TO 33 STEP 2
  PFL = XX: CALL LAYER1
  PFT = PFT - 1
  NEXT
  C1$ = "C15": C2$ = "C 6": C3$ = "C 6": C4$ = "C14"
  PFT = 259: PFL = 40: CALL LAYER1
  PFT = 259: PFL = 36: CALL LAYER1
  PFT = 258: PFL = 38: CALL LAYER1

EFFECT5:
  LINE (402, 4)-(639, 176), 15, B
  LINE (403, 5)-(638, 175), 11, B
  LINE (404, 6)-(637, 174), 9, BF
     WORD$ = "Lfx"
  SPACING$ = "L2"
     SIZE$ = "48"
      DOT$ = "N"
       BGC = 9
  CALL TRANSLATE
  C1$ = "C 0": C2$ = "C 0"
  PFT = 123
  FOR XX = 408 TO 438 STEP 2
  PFL = XX: CALL NORMAL1
  PFT = PFT - 1: NEXT XX
  PFT = PFT - 1
  C1$ = "C15": C2$ = "C 8": C3$ = "C 7": C4$ = "C15"
  FOR XX = 436 TO 413 STEP -1
  PFL = XX: CALL LAYER1
  PFT = PFT + 1: NEXT XX

AUTHOR:
     WORD$ = "by Jon Mark O'Connor"
  SPACING$ = "R1"
     SIZE$ = " 4"
      DOT$ = "N"
       BGC = 9
  CALL TRANSLATE
  C1$ = "C15": C2$ = "C 0"
  PFT = 167: PFL = 440: CALL NORMAL1
```

COLOR ATTRIBUTES

Value	Color
0	black
1	blue
2	green
3	cyan
4	red
5	magenta
6	brown
7	white (gray)
8	light black (dark gray)
9	light blue
10	light green
11	light cyan
12	light red (orange)
13	light magenta
14	yellow
15	high-intensity white

- WORD$ is the word or string you want to embellish.
- SPACING$ is the amount of space you want to place between words. Used in small sizes, the letterset I've designed is spaced properly, but when you use large letters, you must decrease the space between the letters.

L*n* tells the program to move left by *n* spaces; R*n* tells the program to move right by *n* spaces. To maintain the original spacing, use L0 and R0.

- SIZE$ is the size of the letters. The value you specify must be a multiple of 4; you may increase the value to roughly half the size of your screen's horizontal resolution. (In screen 9, the display is 640 pixels wide and 350 pixels high.) Multiples other than 4 skew the letters.

Because the subroutine LAYER1 employs extensive shadowing, using a size value smaller than 12 will probably produce unattractive results. For smaller letter sizes, use the program's NORMAL0 and NORMAL1 subroutines.

- DOT$ handles special circumstances that arise with the letters *i* and *j*. When you combine a small size value and shadowing, the dots over these letters disappear. Because the text displayed in EFFECT1 doesn't include either of these letters, DOT$ is set to N (for *no dot*).

Later on, if you want to use EFFECT1 to display some text that includes an *i* or a *j*, change N to Y.

- BGC is the color of the background on which WORD$ is placed. Without this line, the listing's PSET commands produce unwanted colored blobs at the beginning of words.

At this point, the program has the information it needs to change *DOS World* into a long drawing sequence.

When the CALL TRANSLATE line executes, control jumps to the translation subroutine, andconversion takes place. When control returns to the main program, the next line of EFFECT1 establishes the colors used to create the gold lettering and shadowing: yellow, white (gray), black, and light black (dark gray).

Blending colors produces interesting hues. For example, if you place a light-red line next to a light-magenta line, you'll see pink on screen. If you change C1$ to C15, WORD$ is displayed in silver instead of gold. As you experiment, you'll find that some colors blend well and others don't.

Just for Effect

The message *DOS World* is in a DRAW command, you've chosen the colors, and now it's time to display the message on screen—at varying locations and in varying colors, to give the illusion of depth.

EFFECT1 works its magic by including four calls to the drawing subroutine LAYER1.

Each time through, LAYER1 executes 12 PSET commands, each of which begins drawing at a different screen location.

Keep in mind that the coordinates for the pixel in the upper-left corner are (0,0). So, when the starting positions for PFT and PFL are 52 and 13, respectively, they're 53 pixels from the top and 14 pixels from the left.

```
ALPHABET:
  LINE (1, 315)-(639, 331), 7, B
  LINE (2, 316)-(638, 330), 15, BF
     WORD$ = "ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
       0123456789!@#$%^&*()_-+=:;'."
  SPACING$ = "R0"
     SIZE$ = " 4"
      DOT$ = "N"
       BGC = 15
  CALL TRANSLATE
  C1$ = "C 1"
  PFT = 325: PFL = 5: CALL NORMAL0

HITENTER:
  LINE (2, 337)-(78, 350), 2, BF
     WORD$ = "Hit Enter"
  SPACING$ = "R1"
     SIZE$ = " 4"
      DOT$ = "N"
       BGC = 2
  CALL TRANSLATE
  C1$ = "C14"
  PFT = 346: PFL = 5: CALL NORMAL1

INKEY1:
  C1$ = "C14"
  PFT = 346: PFL = 5: CALL NORMAL1
  SLEEP 1
  C1$ = "C10"
  PFT = 346: PFL = 5: CALL NORMAL1
  SLEEP 1
  A$ = INKEY$: IF A$ = "" THEN GOTO INKEY1
  END

''''''''''''''''''''' SUBS ''''''''''''''''''

DEFINT A-Z
SUB LAYER1
  PSET (PFL + 2, PFT + 5), BGC: DRAW C3$ + P$
  PSET (PFL + 0, PFT + 5), BGC: DRAW C3$ + P$
  PSET (PFL + 1, PFT + 5), BGC: DRAW C3$ + P$
  PSET (PFL + 0, PFT + 4), BGC: DRAW C3$ + P$
  PSET (PFL + 1, PFT + 2), BGC: DRAW C2$ + P$
  PSET (PFL + 2, PFT + 4), BGC: DRAW C1$ + P$
  PSET (PFL + 3, PFT + 3), BGC: DRAW C4$ + P$
  PSET (PFL + 3, PFT + 2), BGC: DRAW C2$ + P$
  PSET (PFL + 4, PFT + 4), BGC: DRAW C2$ + P$
  PSET (PFL + 5, PFT + 2), BGC: DRAW C3$ + P$
  PSET (PFL + 5, PFT + 3), BGC: DRAW C2$ + P$
  PSET (PFL + 4, PFT + 3), BGC: DRAW C1$ + P$
END SUB

DEFINT A-Z
SUB LAYER2
  PSET (PFL + 0, PFT + 5), BGC: DRAW C4$ + P$
  PSET (PFL + 0, PFT + 3), BGC: DRAW C4$ + P$
  PSET (PFL + 2, PFT + 3), BGC: DRAW C1$ + P$
  PSET (PFL + 1, PFT + 2), BGC: DRAW C1$ + P$
  PSET (PFL + 2, PFT + 4), BGC: DRAW C4$ + P$
  PSET (PFL + 3, PFT + 3), BGC: DRAW C3$ + P$
  PSET (PFL + 3, PFT + 2), BGC: DRAW C1$ + P$
  PSET (PFL + 4, PFT + 4), BGC: DRAW C1$ + P$
  PSET (PFL + 5, PFT + 2), BGC: DRAW C1$ + P$
  PSET (PFL + 5, PFT + 3), BGC: DRAW C2$ + P$
  PSET (PFL + 4, PFT + 3), BGC: DRAW C1$ + P$
END SUB
```

```
DEFINT A-Z
SUB LETTERS
    P$(32) = "BR4"                                               'space
    P$(33) = "BR1BD1U1BU2U5BD7BR3"                                 '!
    P$(34) = "BR0BU7D2BR2U2BD7BR3"                                 '"
    P$(35) = "BD1BR1U8D2L1R5L1U2D8U2L4R5BR2BD1"                    '#
    P$(36) = "BD1BR3U8D8BL3BU5U1E1R3F1BD1BL5F1R3F1D1G1L3H1BR7BD1"  '$
    P$(37) = "BD1U1E6U1BL5BD2U1R1D1L1BD4BR4R1D1L1U1BD1BR5"         '%
    P$(38) = "BR1BU2BL1E3U1H1L1G1D1F6BU1BL5BU3G2D1F1R3E3BD2BR2"    '&
    P$(39) = "BR2BU7D1G1BD5BR4"                                    ''
    P$(40) = "BR1BD1BU2U4E2G2D4F2BU1BR4"                           '(
    P$(41) = "BR2BD1BU2U4H2F2D4G2BU1BR5"                           ')
    P$(42) = "BR2BU2U6D3L2R4BL4BD2E4BL4F4BD3BR4"                   '*
    P$(43) = "BR2BD1U7D3L2R5BD3BR3"                                '+
    P$(44) = "BD1U1R1D2G1BU3BR4"                                   ',
    P$(45) = "BR1BU3R3L3BD3BR5"                                    '-
    P$(46) = "BD1BR1L1BU1BR4"                                      '.
    P$(47) = "BR1E5G5BR7"                                          '/
    P$(48) = "BD1BU1U6E1R2F1D6G1L2H1BR6"                           '0
    P$(49) = "BD1BR2U7BL1E1D1BD6BR3"                               '1
    P$(50) = "BR1BU6E1R2F1D2G4D1R4BU1BR3"                          '2
    P$(51) = "BU6E1R2F1D2G1L2R2F1D2G1L2H1BR7"                      '3
    P$(52) = "BU3E4D8U4L4R5BD3BR3"                                 '4
    P$(53) = "BR1BU3U4R4L4D4E1R2F1D3G1L2H1BR7"                     '5
    P$(54) = "BR1BD1BU4U3E1R2F1H1L2G1D6F1R2E1U3H1L2G1BD3BR6"       '6
    P$(55) = "BR1BU7R4D3G4D1BU1BR7"                                '7
    P$(56) = "BR1BU6E1R2F1D2G1L2R2F1D2G1L2H1U2E1H1U2BD6BR7"        '8
    P$(57) = "BR1BU4U2E1R2F1D6G1L2H1BU4F1R3BD3BR3"                 '9
    P$(58) = "BR1U1BU2U1BD4BR3"                                    ':
    P$(59) = "BD1BR1BU1U1BU2U1BD4G1BU1BR6"                         ';
    P$(60) = "BU3E3G3F3BR3"                                        '<
    P$(61) = "BU3R4BD2L4BR7BD1"                                    '=
    P$(62) = "BU6BR1F3G3BR5"                                       '>
    P$(63) = "BR1BU5U1E1R2F1D2G1D1BD2D1BU1BR3"                     '?
    P$(64) = "BD1BU1U6E1R3F1D5L2H1U2E1R1D3BD3L3H1F1R3E1BR3"        '@
    P$(65) = "BD1U7E1R3F1D3L5R5D4BR4BU1"                           'A
    P$(66) = "BD1U8R4F1D2G1L4R4F1D2G1L4BU1BR9"                     'B
    P$(67) = "BD1BU1U6E1R3F1BD6G1L3H1F1R3BR4BU1"                   'C
    P$(68) = "BD1U8R4F1D6G1L4BR9BU1 "                              'D
    P$(69) = "BD1U8R4L4D4R3L3D4R4BU1BR4"                           'E
    P$(70) = "BD1U8R5L5D4R4L4D4BR8BU1"                             'F
    P$(71) = "BD1BU1U6E1R3F1BD6G1L3H1F1R3E1U3L2R2D3BR4"            'G
    P$(72) = "BD1U8D4R4U4D8BR4BU1"                                 'H
    P$(73) = "BD1BR3U8L1R2L1D8L1R2BR4BU1"                          'I
    P$(74) = "BD1BU1F1R2E1U7L1R2L1D7BR5"                           'J
    P$(75) = "BD1BU8D8U4R1E4G4F4BR4BU1"                            'K
    P$(76) = "BD1BU8D8R4BU1BR4"                                    'L
    P$(77) = "BD1U7E1R2F1D7U7E1R2F1D7BU1BR4"                       'M
    P$(78) = "BD1U8F7D1U8D8BR4BU1"                                 'N
    P$(79) = "BD1BU1U6E1R3F1BD6G1L3H1BR5U6D6BR4"                   'O
    P$(80) = "BD1U8R4F1D2G1L4D4BR9BU1"                             'P
    P$(81) = "BD1BU1U6E1R3F1BD6G1L3H1BR5U6BL3BD5F3BG3BR7BU5"       'Q
    P$(82) = "BD1U8R4F1D2G1L4R1F4BR4BU1"                           'R
    P$(83) = "BD1BU5U2E1R3F1BD2BL5F1R3F1D2G1L3H1BR9"               'S
    P$(84) = "BR3BD1BU8L4R6L3D8BR6BU1"                             'T
    P$(85) = "BD1BU1U7D7F1R3E1U7D7BR4"                             'U
    P$(86) = "BD1BU8D5F2D1U1E2U5D5BR5BD2"                          'V
    P$(87) = "BD1BU1U7D7F1R2E1U7D7F1R2E1U7D7BD1BR4BU1"             'W
    P$(88) = "BD1BU8D1F3E3U1D1G6D1U1E3F3D1BU1BR5"                  'X
    P$(89) = "BL1BU5U2D2F3E3U2D2G3D3BU1BR7"                        'Y
    P$(90) = "BU7R5D2G5D1R5BR4BU1"                                 'Z
    P$(91) = "BR1BD1BR3L3U8R3BR3BD7"                               '[
    P$(92) = "BU5F5BR3"                                            '\
    P$(93) = "BD1R3U8L3BR2BD7BR4"                                  ']
    P$(94) = "BR1BU5E2F2BD5BR2"                                    '^
    P$(95) = "BD1R4BU1BL2BR5"                                      '_
```

The first four commands in LAYER1 use C3$, black, to produce four renditions of the text in black. These renditions overlap, producing a shadowing effect. The use of gray in the fifth line adds more depth to the shadow.

This same multilayer approach enhances the appearance of the gold lettering: three renditions of the text—two in yellow and one in white—overlap to give the words both height and depth.

But maybe you don't care for gold, or you'd like a little less shadow. No problem. Just do what I did to come up with the effects shown in the listing: Set different background colors, combine various foreground colors, experiment with the values of PFL and PFT, use more or fewer calls to LAYER1, or include more or fewer PSET commands.

Remember, though: If you add too many shadows, the letters of your text will overlap, unless you increase the value of SPACING$.

Try adding REM statements before all but one of the CALL LAYER1 or PSET lines, to get a sense of how that line affects the final appearance of the text. Repeat the procedure with other lines.

Or take a few minutes to type in and study some of the other effects (and the subroutines on which they depend). EFFECT2 is a good place to start. Type this line:

```
EFFECT2:
```

Then copy all of EFFECT1 under EFFECT2:. After that, change all the values of the parameters.

Like EFFECT1, it relies on LAYER1, but the result is distinct, which demonstrates just how flexible LFX.BAS is. From a single letterset, 16 colors, and just one basic DRAW routine, you can create very different effects.

When you're finally ready to begin experimenting, don't worry too much about the final result. Just play. When I sit down to work with LFX.BAS, I don't have a particular design in mind. Ideas occur to me as I work, and that will happen with you, too. Sometimes, making a slight change in PFT or PFL produces unexpectedly good results, which you can then capitalize on.

Shadowing is also very important, as the rendition of *Sugar's Shack* (EFFECT4) in the screen shot demonstrates. Often, words that look plain are greatly improved by the addition of a series of shadows placed one or two pixels to the left or right of the main word. Be sure, however, to place the commands that draw shadows before the ones that draw the text so that the shadows remain in the background.

If you're not sure whether a particular color is adding anything to the overall effect, change the color to something else. It isn't always apparent, for example, whether color 8 is enhancing the appearance of a shadow. To find out, change the color value to 14. If you see yellow lines, you know that the original color is having an impact, and you may then change the color setting back to 8.

Before you jump into creating full-screen displays, such as menus, consider the speed of your computer. On a 25MHz 386 or a slower system, displaying a full screen of special effects might take a few seconds. If neither you nor your clients or friends mind a delay of that length, then by all means go ahead with the project. If you don't want the user to see the effect being drawn, add the command SCREEN 9, 9, 0, 1 at the beginning of the display process and SCREEN 9, 9, 1, 0 at the end. This flashes the display on the screen.

If you're not partial to either of those display methods, try using a SCREEN 12 command to produce your effects at a higher resolution.

Choices, choices, choices—LFX.BAS gives you a lot of them. But isn't that one of the great things about programming? You control the final effects. ■

```
   P$(96) = "BR2BU7D1F1BD5BR2"                                      '`
   P$(97) = "U2E1R3U1H1L2G1E1R2F1D4G1L2H1F1BR2E1U2D3BR4BU1"         'a
   P$(98) = "BD1U8D8R3E1U4H1L2G1D4BR8"                              'b
   P$(99) = "BR0U4E1R2F1BD4G1L2H1F1R2E1BR4"                         'c
  P$(100) = "U4E1R2F1H1L2G1D4F1R2E1U7D7D1BU1BR4"                    'd
  P$(101) = "U4E1R2F1D2L4D2F1R2E1BR4"                               'e
  P$(102) = "BR1BD1U7E1R2F1H1L2G1D3L1R3BD3BR5"                      'f
  P$(103) = "U4E1R2F1D4G1L2H1BD3F1R2E1U3BR4"                        'g
  P$(104) = "BU7D8U5E1R2F1D5BU1BR4"                                 'h
  P$(105) = "BR3BD1U6BU2BD7BR4"                                     'i
  P$(106) = "BR1BD1U6BU2BD7D3G1L2BU4BR8"                            'j
  P$(107) = "BD1BU8D8U3E3G3F3BU1BR3"                                'k
  P$(108) = "BR1BD1U8L1R1D8L1R2BR4BU1"                              'l
  P$(109) = "BD1U6D1E1R1F1D5U5E1R1F1D5BU1BR4"                       'm
  P$(110) = "BD1U6D1E1R2F1D5U4BD3BR4"                               'n
  P$(111) = "U4E1R2F1D4G1L2H1BR8"                                   'o
  P$(112) = "U4E1R2F1D4G1L2H1D4U4BR8"                               'p
  P$(113) = "U4E1R2F1D4G1L2H1BR4D4L1R2L1U4BR5"                      'q
  P$(114) = "BD1U6D1E1R2F1H1L2G1U1D6BU1BR7"                         'r
  P$(115) = "BU3U1E1R2F1H1L2G1D1F1R2F1D1G1L2H1BR8"                  's
  P$(116) = "BR1BU7D2L2R4L2D5F1R1E1BR4"                             't
  P$(117) = "U5D5F1R2E1U5D5BR4"                                     'u
  P$(118) = "BD1BU6D3F2D1U1E2U3D3BD2BR4"                            'v
  P$(119) = "BD1BU6D5F1R1E1U4D4F1R1E1U5D5BR4"                       'w
  P$(120) = "BD1BU6D1F2E2U1D1G4D1U1E2F2D1BU1BR4"                    'x
  P$(121) = "BU5D5F1R2E1U5D8G1L2H1BU3BR8"                           'y
  P$(122) = "BU5R4D1G4D1R4BU1BR4"                                   'z
END SUB

DEFINT A-Z
SUB NORMAL0
  PSET (PFL + 0, PFT + 0), BGC: DRAW C1$ + P$
END SUB

DEFINT A-Z
SUB NORMAL1
  PSET (PFL + 0, PFT + 1), BGC: DRAW C2$ + P$
  PSET (PFL + 1, PFT + 0), BGC: DRAW C1$ + P$
  PSET (PFL + 2, PFT + 0), BGC: DRAW C1$ + P$
END SUB

DEFINT A-Z
SUB TRANSLATE
  SPACING$ = "B" + UCASE$(SPACING$)
     SIZE$ = "S" + UCASE$(SIZE$)
  P$(105) = "BR0BD1U6BU2BD7BR4"           'i
  P$(106) = "BR1BD1U6BU2BD7D3G1L2BU4BR8" 'j
  IF DOT$ = "Y" THEN P$(105) = "BR0BD1U6BU1U1BD7BR4"         'Dot over i.
  IF DOT$ = "Y" THEN P$(106) = "BR1BD1U6BU1U1BD7D3G1L2BU4BR8" 'Dot over j.
  P$ = SIZE$
  FOR J = 1 TO LEN(WORD$)
  P$ = P$ + P$(ASC(MID$(WORD$, J, 1))) + SPACING$
  NEXT J
END SUB
```

End

DOS WORLD

Readers' Queue

ONCE AGAIN

In the September 1994 issue (*DOS World* #17, page 66), we published three one-line QBasic programs submitted by reader Tom Sales, and we invited others to share their own one-liners. Thus far, we've received a couple of dozen entries, including several from Tom Sales himself. In this issue, we publish his five one-line games of chance. In upcoming issues, we'll pass on a few more of his listings, along with any other noteworthy one-liners we receive. That means it's not too late for you to get into the act. If you have a listing you'd like us to consider, send a disk containing the program and a paragraph or two of explanatory text to: One-Liners, *DOS World* Editorial, 80 Elm Street, P.O. Box 802, Peterborough, NH 03458-0802. Please include an address and daytime phone number with your submission. —*Eds.*

Take a Chance

Thank you for publishing my one-liner programs in the September 1994 issue. I find that apart from being fun, they're also challenging to write. Since I began creating them, my modest programming skills have improved considerably, because I've had to work at squeezing my concepts into a single line. Sometimes, of course, a project turns out to be impossible to accomplish in 254 characters (the screen freezes if you try to include 255 characters), but I now have a feel for what can be done.

My collection of games of chance includes five programs (facing page): FLIP.BAS, ESP.BAS, WHEEL_O.BAS, SLOT.BAS, and DIE_ODDS.BAS. To keep things short, I didn't include a "Quit/Continue?" prompt in any of these listings. When you've played a game to your heart's content, press Ctrl+Break to return to QBasic.

FLIP.BAS and ESP.BAS both revolve around the flip of a coin. In FLIP.BAS, you see a coin tossed into the air. When it lands, the program displays an H or a T to let you know the outcome of the toss. I think of this program as an executive decision maker: Heads, you leave work early; tails, you stay until quitting time.

ESP.BAS, in contrast, takes a statistical approach. It prompts you to guess an H or a T, tells you the outcome of the toss, displays the total number of yes (correct) and no (incorrect) responses, and tells you your score (the percentage of correct guesses).

As its name suggests, WHEEL_O.BAS lets you try your luck at a wheel of fortune. The program starts you out with $1000 and prompts you for the amount you want

IMPROVEMENTS & CORRECTIONS

Return of the Globs

I have a suggestion for making Tom Sales's globs look more glob-like ["Readers' Queue," September 1994, page 66]. To remove the pesky spots that appear when you run the original listing, add the following CIRCLE statement after the one-liner's existing CIRCLE statement:

```
CIRCLE (X, Y-1), I, C:
```

Rick Ellis
Brea, Calif.

GLOBS1.BAS, an improved version of GLOBS.BAS, eliminates the spots that appear in the original listing's globs. This listing comprises a single program line.

```
SCREEN 13: DO: X = RND * 320: Y = RND * 240: C = 31: R = RND *
  25 + 10: CS = C / R / 2.3: FOR I = 1 TO R: CIRCLE (X, Y), I, C:
    CIRCLE (X, Y - 1), I, C: C = C - CS: NEXT: LOOP
```

End

to bet and the number you think will come up. When you're right, your win is added to the pot; if you're wrong, the loss is subtracted. The nicest thing about this game, though, is that losing doesn't cost you anything.

SLOT.BAS is similarly risk-free. Again, you start with $1000; when you press any key to enter a $10 bet, the slot machine's three digits spin. When the leftmost and center slots match, the payoff is seven times the matching number. As with "real" one-armed bandits, you win big when all three numbers match: 10 times the square of the matching number, to be exact.

DIE_ODDS.BAS is the most unusual of this group. It simulates the results of tossing two dice, dropping "rocks" in ever-growing piles to illustrate the outcome visually. If you toss two dice, the odds are greatest that you'll throw a total of seven; a sum of 2 or 12 is the least likely to turn up.

In the program's on-screen display, the left column indicates the number of times the value of a roll will equal 2, the next column shows the number of times it will equal 3, and so on. Piles of equal color represent totals with the same odds.

Tom Sales
Somerset, N.J.

FLIP.BAS, an executive decision maker, "tosses" a coin and tells you whether it turned up heads or tails.

```
SCREEN 12: DO: Z = 2000!: X = 300: Y = 343:
  R = 30: A = .1: N = .2: CLS : SOUND Z * 2, .1:
  FOR I = 1 TO 100: CIRCLE (X, Y), R, 0, , , B:
  B = A: H = -5 - 10 * (I > 50): Y = Y + H:
  CIRCLE (X, Y), R, 15, , , A: S = A > 1:
  S = S - 1 * NOT (S): N = N * S: A = A + N:
  NEXT: SOUND Z, .1: LOCATE 22, 38: RANDOMIZE
  TIMER: PRINT CHR$(72 - 12 * (RND > .5)):
  SLEEP 2: LOOP
```

End

ESP.BAS, another coin-flipping program, lets you test your psychic abilities by guessing whether successive flips of a coin will turn up heads or tails.

```
CLS : CLEAR : P$(2) = "YES": P$(1) = "NO": DO:
  PRINT : PRINT "GUESS: "; : SLEEP:
  G$ = UCASE$(INKEY$): PRINT G$: RANDOMIZE TIMER:
  C$ = CHR$(72 - 12 * (RND > .5)):
  PRINT "COIN:  "; C$, : T = 1 + (G$ <> C$):
  PRINT P$(T + 1): SOUND 4000 * T, .5:
  A(T) = A(T) + 1: N = A(0): Y = A(1):
  PRINT "YES="; Y, "NO="; N, "SCORE=";
  CINT((Y / (Y + N) * 100)); "%": LOOP
```

End

WHEEL_O.BAS simulates a wheel of fortune.

```
K = 3 / 172: P = 1000!: J = 10: R = 36: DO: CLS :
  PRINT : PRINT "$"; P: PRINT : INPUT "BET"; B:
  INPUT "NUM"; N: LOCATE J, 53: PRINT "<--":
  L = 0: FOR S = 1 TO R * RND + R: L = L + R:
  C = L: FOR I = 0 TO 9:
  LOCATE SIN(C * K) * 5 + J, COS(C * K) * 12 + R:
  PRINT I: C = C + R: NEXT: NEXT: BEEP:
  T = L / 360: W% = J - (T - INT(T)) * J:
  F = N = W%: P = P - B * J * F + B * NOT F:
  SLEEP 2: LOOP
```

End

SLOT.BAS lets you try your luck against a simple electronic "one-armed bandit."

```
'INITIAL STAKES =   $1000
'MANDATORY BET =  $10
'PAYOFFS:  [ N N - ] = 7 times N
'          [ N N N ] = 10 times N times N
'
 ________________________________________________

' THUS: [ 2 2 - ] =  7*2 = $14 [ 2 2 2 ] = 10*2*2 = $40
'       [ 3 3 - ] = $21       [ 3 3 3 ] = $90
'       [ 4 4 - ] = $28       [ 4 4 4 ] = $160
'       [ 5 5 - ] = $35       [ 5 5 5 ] = $250
'       [ 6 6 - ] = $42       [ 6 6 6 ] = $360
'       [ 7 7 - ] = $49       [ 7 7 7 ] = $490
'       [ 8 8 - ] = $56       [ 8 8 8 ] = $640
'       [ 9 9 - ] = $63       [ 9 9 9 ] = $810

SCREEN 1: COLOR 8: CLS : S = 1000!: DO:
  RANDOMIZE TIMER: LOCATE 6, 16: PRINT "$"; S:
  SLEEP: S = S - 10: FOR I = 1 TO 250:
  FOR T = 1 TO 3: V% = RND * 8 + 1.5: V(T) = V%:
  NEXT: LOCATE 12, 15: A = V(1): B = V(2): C = V(3):
  PRINT A; B; C; : SOUND 3000! - I * 10, .06:
  NEXT: X = A = B AND B = C: W = X = 0 AND A = B:
  D = 7 * A * W + 10 * A * A * X: S = S - D: LOOP
'NOTE: To speed up or slow down play,
'you may substitute another value for 250.
```

End

DIE_ODDS.BAS simulates the results of tossing two dice, dropping "rocks" into ever-growing piles to illustrate the outcome visually.

```
T%(2) = 0: SCREEN 13: DO: CLS : L = 198: DO:
  RANDOMIZE TIMER: R = INT(RND * 160 + RND * 160):
  C = INT(R / 29 + 2): C = C + 2 * (C - 7) * (C > 7):
  I = L: DO: ERASE T%: GET (R, I + 1)-(R, I + 1), T%:
  PSET (R, I), C: PRESET (R, I - 1): I = I + 1:
  LOOP WHILE (I < 199 AND T%(2) = 0): T = I - 1 = L:
  L = L + T: SOUND 4000, .05:
  LOOP UNTIL L = 10: LOOP
```

End

The Personal Touch

To my way of thinking, memory-resident screen savers eat up too much memory. I prefer a simple screen saver I can bring up when I know I'll be on the phone awhile or away from my desk. My favorite is PERSONAL.BAS (see the listing, below right), a program I can call into QBasic, edit quickly to include an appropriate message, and run. Here's how to use it.

After loading the listing into QBasic, move the cursor to the third line, and type your name or a message between the quotations marks. The message may not exceed 80 characters.

Save the program and run it by pressing Shift+F5 or choosing the Run menu's Start option. After the screen clears, the system displays your message on screen for two seconds, erases it, and prints it in another color at a randomly chosen screen location. When you're ready to resume use of your computer, press any key. The screen clears, and a message tells you how many minutes the screen saver was on.

To make PERSONAL.BAS even easier to use, create the following two-line batch file to load QBasic and run the program:

```
@ECHO OFF
QBASIC /RUN [path\]PERSONAL
```

(The brackets around *path* indicate that this parameter is optional.) Thereafter, you may start the screen saver by typing `PERSONAL` at the DOS prompt. To save keystrokes, you could name the program PSS.BAT (for *Personal Screen Saver*).

Of course, it makes sense to use a batch file to run the program only if you don't want to change the message each time you use it.

To ensure that the program didn't exceed *DOS World*'s 50-line limit, I kept my screen saver simple. After clearing the screen, it uses the STARTTIME# variable to get a value from the TIMER function. The program uses this value later to determine how long the screen saver was on.

In the fourth line, the RANDOMIZE TIMER statement seeds the random-number generator. Next, a loop executes; it continues as long as there's no keyboard activity, randomly selecting the row, column, and color in which to print your message. Nested within the first loop is a timing loop that uses TIMER to determine when two seconds have elapsed.

The INKEY$ function watches for a keystroke. If you don't press a key, the second loop times out, the system erases the text currently displayed on screen by printing over it in black, and the main loop calculates the new position and color of your message.

When you press a key, both loops close and the screen clears. The program calls TIMER again and uses the value of STARTTIME# to calculate the time the screen saver ran. A PRINT USING statement formats and displays the information regarding elapsed time.

Tim Syrop
Carlin, Nev.

PERSONAL.BAS blanks your computer screen and displays the message of your choice at randomly selected screen locations.

```
CLS
STARTTIME# = TIMER
NAME$ = "Place your name or message here."
RANDOMIZE TIMER

DO
  IMBACK$ = INKEY$
  ROW% = INT(RND * 25) + 1
  COL% = INT(RND * (80 - LEN(NAME$)) + 1)
  COLORS% = INT(RND * 15) + 1
  LOCATE ROW%, COL%
  COLOR COLORS%
  PRINT NAME$;
  LOCATE ROW%, COL%
  PAUSE# = TIMER
    DO
      IMBACK$ = INKEY$
        IF IMBACK$ > "" THEN EXIT DO
    LOOP UNTIL TIMER > PAUSE# + 2
  PRINT SPACE$(LEN(NAME$));
LOOP UNTIL IMBACK$ > ""

COLOR 7, 0
CLS
PRINTTIME# = (TIMER - STARTTIME#) / 60

IF PRINTTIME# < 1 THEN
  PRINT "The screen saver was on less than one minute."
  SYSTEM
ELSEIF PRINTTIME# < 1.5 THEN MINS$ = "Minute."
ELSE
  MINS$ = "Minutes."
END IF

IF PRINTTIME# < 1000 THEN A$ = "###"
IF PRINTTIME# < 100 THEN A$ = "##"
IF PRINTTIME# < 10 THEN A$ = "#"
PRINT "The screen saver was on ";
PRINT USING A$; PRINTTIME#;
PRINT " "; MINS$
SYSTEM
```

End

START-UP CLINIC

Snug as a Debug In a Rug

by Jack Nimersheim

"A little knowledge is a dangerous thing," states a familiar axiom. It's especially valid where computers are concerned—and when you're tinkering around with the "bits and bytes" that represent the lowest level of a PC's operating hierarchy.

Several recent letters to this column have mentioned Debug, a valuable yet potentially volatile utility included with MS-DOS. Bearing in mind my opening statement, let's see whether I can clear up some of the mystery regarding what Debug is, what it does, and when (if ever) you should use it. Then we'll discuss two more-benign DOS commands: FORMAT and XCOPY.

> *DOS commands are tools, not toys, and should be used only if you know what you're doing. Handled properly, however, they can perform a number of helpful procedures.*

Demystifying Debug

A number of articles in recent issues of DOS World *have mentioned something called a Debug script. A friend told me I could crash my system, maybe even burn out my hardware, if I started playing around with Debug. Is he correct? Just what is Debug, and how do you use it?*

George R. Simpson
Fresno, Calif.

The answer to your first question is easy: Yes, you can, indeed, crash your system if you start "playing around" with Debug. It's a tool, not a toy. And, like most powerful tools, it should be used only by someone who knows what he or she is doing. Having said that, however, let me add that there are times when it's appropriate for the average user to rely on Debug for a specific operation—but always under the tutelage of someone familiar with how Debug works.

Microsoft's description of Debug is deceptively unsophisticated. The *MS-DOS User's Guide* states that the Debug program "allows you to test and debug executable files." Ignoring for a moment the recursive nature of Microsoft's definition, let me explain coherently how Debug works. Stated simply, you can use it to change the value of bytes stored in memory or on disk. But even that short-and-lucid description only hints at Debug's power and the potential perils associated with it.

One possible use for Debug, for example, is to initiate a low-level format of a hard disk. Low-level formatting, usually performed by a disk's manufacturer, is an operation one step below the procedure initiated by the MS-DOS FORMAT command. That's one justification for your friend's warning. Used improperly, Debug can destroy all data on a disk.

Used properly, however, Debug can also perform a number of helpful procedures. For example, the Debug scripts printed in *DOS World*, and available from the *DOS World* BBS, are text files that, when processed through Debug, are converted automatically to executable program files. Basically, Debug translates into executable code the English-like commands the scripts tell you to enter at your keyboard.

The instructions explaining how to accomplish that are always included with *DOS World*'s Debug scripts. Follow them precisely and you'll have no problem—and you'll end up with a valuable utility. But remember, Debug is a tool, not a toy. Don't play around with it on your own if you don't understand what you're doing.

The Flexible FORMAT Command

Why does the FORMAT *command in MS-DOS 5 and later always check for a previous format before reformatting a disk? Is there some way to disable that feature to speed up formatting?*

Michael Agnew
Detroit, Mich.

By default, the FORMAT command in newer versions of DOS protects against lost data by attempting, whenever possible, to keep a record of the files a disk contained previously. This information, if available, lets you use the UNFORMAT command to recover data on a disk that's formatted accidentally.

You can override FORMAT's default procedures, however, with two simple command switches. One disables data preservation. The second speeds up the FORMAT operation even more by telling DOS to overwrite only those sectors and tracks required to free up space on a disk for additional file storage.

The /U switch forces DOS to perform an "unconditional" format, one in which it overwrites the entire disk without preserving any information about its previous contents. When you type `FORMAT A: /U`, DOS formats the disk in drive A and displays its progress on screen as a percentage of the complete format operation. When the operation continues, the disk is scrubbed clean—that is, every sector it contains is devoid of data. It's impossible to recover previously stored files on a disk that has been formatted with the /U switch. During an unconditional format, DOS automatically checks for bad sectors and marks them as unusable, if present.

The /Q switch tells DOS to perform a "quick" format. When you type in a `FORMAT A: /Q` command, DOS clears only portions of the disk in drive A—specifically, its file-allocation table (FAT) and root directory. Although individual sectors still hold the information they previously contained, DOS can't find that data. As far as DOS is concerned, the disk is available to store new files. One warning: During quick formatting, DOS doesn't check for bad sectors. Therefore, you should use this switch only after running ScanDisk or a similar utility to verify the integrity of the disk you want to format.

The fastest way to format a disk is by combining the /U and /Q switches, as in the following example:

```
FORMAT A: /U /Q
```

Formatting a disk this way requires only a few seconds and leaves it ready to accept new data.

Creative Copies

My NEC Ultralite system assigns drive B to an external ROM or RAM card. One problem that creates is that I haven't found a convenient way to copy files from one 3.5-inch disk to another. COPY *won't let me copy files to the same physical disk drive, as I could with my old XT, which also had a single drive. The NEC returns a "Drive types or diskette types not compatible" message.* DISKCOPY *works, but requires six or seven disk swaps. Is there a workaround?*

Homer Tilton
Tucson, Ariz.

The workaround you're looking for involves using your hard disk as a temporary holding area for the files to be copied. As an added attraction, this workaround, which uses the DOS XCOPY command, will actually perform the disk copy faster than a straight floppy-to-floppy file transfer would. Create a batch file called FCOPY.BAT, containing the following commands:

```
MD C:\HOLDFILE
PAUSE  "Place the source disk in drive A."
XCOPY A:*.* C:\HOLDFILE /S
PAUSE  "Place the target disk in drive A."
XCOPY C:\HOLDFILE\*.* A: /S
DELTREE C:\HOLDFILE /Y
```

Several things happen when you type `FCOPY` to execute this batch file. First, it creates on drive C a directory called \HOLDFILE, which you'll use to hold temporarily the files originally stored on your floppy disk. Next, it pauses execution and reminds you to place the source disk—that is, the disk containing the files you want to copy—into drive A.

After you press any key, the XCOPY command in line 3 copies all files on this disk to the \HOLDFILE directory created in line 1. (The /S switch instructs XCOPY to recreate on your hard disk the floppy disk's subdirectory structure.) The second PAUSE statement halts the batch file and prompts you to replace the source disk in drive A with a target disk—the disk to which you want to copy those files. The second XCOPY command replicates on the target disk the directory and file structure that existed on your original disk. The final line simply performs some housekeeping by deleting the temporary \HOLDFILE directory and all subdirectories or files it contains.

For additional information on potential uses for the various DOS commands in copying files (COPY, XCOPY, REPLACE, and MOVE), check out Ken Johnson's article "Put an End to COPY Confusion," which appeared in the November 1994 issue of *DOS World* (#18, page 24). ■

Jack Nimersheim has been using computers and writing about them for 14 years. He's the author of two dozen books on computer-related topics. His newest book, Windows95 Revealed *(Random House Electronic Publishing), was released last fall.*

DOS WORLD

Q&A

DOS

Q I use DOS 6.2 on my new 486 computer. I also have an XT-class computer running MS-DOS 4. May I install DOS 6.2 on my 8088 computer? If so, may I install only certain elements of DOS 6.2, such as the memory-management and utility programs?

A Microsoft advertises that the changes it makes to new DOS versions let revamped utilities work alongside older utilities (if you use SETVER, that is). In my experience, however, that's not universally true. New versions of BACKUP and RESTORE, for example, are incompatible with older versions, because the file formats have changed. In my opinion, it has always been good computing practice to avoid mixing parts of one version of an operating system with parts from another version—no matter which operating system you have.

To install DOS 6.2 properly, use Setup, which advises you to create an "uninstall" disk and places your old DOS files in a directory called OLD_DOS.*X*. If you want to restore your old DOS version later, use the uninstall disk.

Before you go to the trouble of buying the DOS upgrade, however, consider whether the new features are worthwhile. Among the most-important new utilities are a disk defragmenter, an antivirus program, improved disk-caching software, and a disk-compression program, which will open more than enough space to accommodate the newer, larger DOS. You also get a number of important programs that were introduced in DOS 5, including UNDELETE.EXE, UNFORMAT.COM, and DOSKEY.COM. Because you have an XT, however, you can't take advantage of DOS 6.2's memory-management features.

Q Can you suggest a way to link a DOSKEY macro to a function key rather than to a command typed at the DOS prompt? I want to be able to change the state of my monitor from 40- to 80-column mode by pressing a single key.

A I don't know of a way to accomplish this with DOSKEY, but I can suggest a way that uses ANSI.SYS. (You could use both ANSI.SYS and DOSKEY, but that's a two-step process. It's more efficient to use ANSI.SYS alone.)

First, load ANSI.SYS at start-up by including this line in your CONFIG.SYS file:

```
DEVICE=C:\DOS\ANSI.SYS
```

Second, modify the path if you store ANSI.SYS in a directory other than C:\DOS.

Next, redefine the action that the function keys will take when you press them.

For example, the following batch file, which you might name CHMODE.BAT, "maps" F11 to CO80,25 and F12 to CO40:

```
@ECHO OFF
PROMPT $E[0;133;"MODE CO80,25";13p
PROMPT $E[0;134;"MODE CO40";13p
PROMPT $P$G
```

The first two PROMPT lines are *escape sequences*, commands that tell the keyboard or monitor how to behave. In the first line, $E[is the escape-sequence marker, 0;133 is the ASCII value for the F11 function key, "MODE CO80,25" is the command you want the chosen function key to execute, 13 generates an ASCII 13 character (the equivalent of pressing Enter), and P identifies the command as one that changes the characters a key displays. (See the accompanying table, "Function-Key Equivalents," below, for a list of function-key ASCII values.) Because the first PROMPT command eliminates the prompt that DOS displays at its command line, I use the third line to "reactivate" the prompt and display the current drive and path ($P) and a greater-than sign ($G).

If you store CHMODE.BAT in a directory mentioned in your AUTOEXEC.BAT's PATH statement, you may redefine F11 as MODE CO80,25 and

FUNCTION-KEY EQUIVALENTS

Key	ASCII Value
F1	0;59
F2	0;60
F3	0;61
F4	0;62
F5	0;63
F6	0;64
F7	0;65
F8	0;66
F9	0;67
F10	0;68
F11	0;133
F12	0;134

F12 as MODE40 by typing `CHMODE` at the DOS prompt. Thereafter, to switch between the two modes, simply press F11 or F12.

To redefine these function keys at start-up, add this line near the end of your AUTOEXEC.BAT:

```
CALL CHMODE
```

Q Does the VERIFY command have the same purpose as the /V switch in COPY and XCOPY? May I run VERIFY from my AUTOEXEC.BAT? Will it verify data my application programs store on disk, or only files I copy from place to place with COPY and XCOPY at the DOS prompt? May I use it as a diagnostic tool to point out bad sectors on my hard disk?

A The VERIFY command and COPY's and XCOPY's /V switch use the same disk-sector verification process. Its purpose is to ensure that DOS hasn't written data to a bad disk sector. The command doesn't verify the integrity of the data in a file, only the magnetic area of the disk to which the data was written.

To start verification, use a VERIFY ON command. Thereafter, DOS performs its verification ritual after writing data to each disk sector. It then reads back the sector to make sure all the data can be read.

Remember to disable disk-caching software, such as DOS's SMARTDRV.SYS, before attempting to use VERIFY or /V.

Most disk-caching utilities store information temporarily in memory, instead of writing it to your disk immediately. A disk cache will force DOS's VERIFY routine to write and read its checksum patterns in memory, which defeats the purpose of verification.

Only DOS commands that write data to disk may take advantage of VERIFY or /V. Applications that bypass DOS, writing data directly to your disk, can't employ DOS's verification procedures. Applications that use DOS commands to write information to disk automatically, however, use verification if it's on.

To tell DOS to automatically call for verification for those commands that write information to disk, just add this brief line to your AUTOEXEC.BAT file:

```
VERIFY ON
```

When you do this, you don't need to add a /V switch to each DOS command (although no harm is done if you do). Type `VERIFY OFF` to turn off verification.

You can't use VERIFY as a diagnostic tool, because it provides no feedback to the user when it encounters a bad disk sector. FORMAT and SCANDISK are the only DOS commands that can reliably identify bad disk sectors.

Use DOS's FORMAT command only on new disks or those containing data you want to erase.

Typically, FORMAT spots and "locks out" all bad sectors on a new disk before you use it. DOS's VERIFY command protects your data against damage that occurs after the disk is formatted.

DOS TIP

AD HOC MULTITASKING

To avoid potential conflicts between Windows and DOS programs, it's generally a good idea to configure your DOS applications so that they don't run in the background of a Windows session. Sometimes, though, you may want a DOS operation to continue while you work in another application. For example, you might want to format a disk without interrupting your word processing.

To activate multitasking temporarily, open the Control menu of the DOS window you want to run in the background by clicking on the spacebar icon in the window's upper-left corner. When you click on Settings, a dialog box appears. Click on the Background check box in the Tasking Options section. Choosing this setting tells Windows to share CPU time between the DOS window (the background task) and other applications (foreground tasks).

You control how much time is alotted to each task by varying the values recorded in the Priority section of the Settings dialog box. For instance, if you accept the default values of 50 for the background task (disk formatting, in this example) and 100 for the foreground tasks (in this case, only word processing), formatting gets 33.3 percent of the CPU's time (50 ÷ [50 + 100]), and word processing gets 66.7 percent of the CPU's time. (100 ÷ [50 + 100]).

The settings for Tasking Options and Priority are temporary. If you change them, close the DOS window you set up to run in the background and reopen the window—the Settings dialog box displays Windows' default values.

—Jack Nimersheim

HARDWARE

Q When I try to start my computer from its hard disk, the boot process ends prematurely, and I get a hardware-configuration error message. If I then start my system's setup program and type in the required hard-disk settings, the computer boots normally from the hard disk. Unfortunately, the next time I turn on the computer, the problem reappears. I've checked the hard-disk controller settings, installed new cables, and installed a new hard-disk controller card. Nothing seems to produce a normal boot sequence. Can you help?

A The backup battery (or battery pack) that supplies power to your CMOS RAM, the memory that holds your computer's hardware-setup information, may be weak, dead, or missing. The battery maintains critical hardware settings when you turn off your computer's power switch. Without sufficient power, a backup battery can't hold onto the CMOS settings, and you have to supply configuration information each time you boot.

Before you look inside, you might want to leave your system running for a day or so. (You may leave the monitor off.) If you have a rechargeable nickel-cadmium battery, this should fix the problem.

If the trouble persists, you'll have to unplug your system and open up its case. On some systems, the CMOS battery is attached to the motherboard. If it's soldered in place, you should have a computer-repair service handle the replacement. On other systems, you'll find a battery pack mounted on a disk-drive cage or the power supply, where it's held in place by a velcro strip or even tape. You may replace the old batteries—most likely they'll be AAA batteries—with high-quality alkaline batteries and remount the battery pack.

Q My 80286 PC is equipped with both a 5.25-inch (drive A) and a 3.5-inch (drive B) floppy drive. Right now, the computer boots from the 5.25-inch drive, but I'd prefer that it boot from the 3.5-inch drive. Can I swap boot drives without performing major hardware surgery?

A Yes, you can swap boot drives by making a few simple changes to your system's hardware. Before you open your PC's case, though, check its built-in setup program for a simpler solution. (If you're unsure how to access this program, consult the manual supplied with your PC.) The setup program provided with many PCs lets you designate the start-up floppy drive simply by typing a new drive letter (A or B) in response to a prompt.

If your computer's setup program doesn't provide that option, you'll need to open up the case and perform a cable swap. First, turn off your computer's main power switch. Then, working with one hand, touch the metal portion of the power-supply case (a large metal box, often positioned near the back of the case) to discharge any static electricity your body may hold. Next, locate the 34-pin ribbon cable that connects the hard/floppy-disk controller card to both floppy drives, then find the connectors for the first and second floppy drives. (The first connector is at the end of the cable; the second connector is several inches from the end.)

Remove the cable connectors from both floppy drives. Notice that the cable connectors are keyed to fit into a small slot on the connector for the card from which you removed them. Using the same cable orientation (mark the cable to keep track), swap the connectors between the two floppy drives.

When you're sure the connectors are seated properly, close the case and restart your computer. Place a bootable system disk into drive B, then turn on the main power switch.

If your PC boots from the floppy disk in drive B, you've finished the job. If not, you'll need to change the position of the "drive select" jumper plugs, which are usually located near the ribbon-cable connector at the rear of both drives.

Taking the same precautions as before, open your case and remove the jumper plug from the pin pair marked DRIVE SELECT 0 (drive A). Insert the same jumper plug over the pins marked DRIVE SELECT 1 (drive A). Reverse this procedure for drive B. Close the case and restart your computer.

Q The setup program for my new 486 computer includes an option called *BIOS shadowing*. What does this term mean? Does BIOS shadowing improve PC system performance? Will it cause compatibility problems with my software?

A BIOS shadowing is a technique used to speed up the operation of a computer's built-in ROM and basic input/output system (BIOS) routines, which normally reside in relatively slow-acting static RAM (SRAM) chips or electronically programmable read-only memory (EPROM) chips.

All 386, 486, and Pentium systems can use BIOS shadowing, but only 286 computers equipped with the correct type of chip sets have this capability.

When you start a computer that uses BIOS shadowing, a special program relocates the ROM and video BIOS routines to the appropriate area of fast-acting memory. The program then changes the address of the RAM so that it appears to the CPU that it resides at the memory address assigned to the ROM. Because RAM chips can respond faster than SRAM or EPROM chips, software that uses BIOS routines can work faster.

The performance increase may vary on your system from small to dramatic, depending on the type of application software you use.

With today's hardware, it's unlikely that compatibility problems will arise if your system uses BIOS shadowing. You may run into trouble, though, if your memory manager takes over addresses in high memory your BIOS is using.

Another disadvantage is that less expanded (EMS) and extended (XMS) memory is available for use by other programs. ■

"Q&A" is compiled by Technical Editor John Wolfskill. He's president of Powertrain Development, a software-design company based in New Hampshire.

WINDOWS SEAT

Fun with Windows' File/Run

by Eric Maloney

Never thought you'd miss the stark DOS command line? Well, all that pointing and clicking in Windows might make you homesick for its efficiency. But even when you're not in a DOS window, you still have access to something similar: Windows' File/Run. In Program Manager, click on File and then Run (or press Alt+F, then R, on your keyboard), and you're there.

Windows' File/Run, however, is a pretty sorry excuse for a command line, incapable of running internal DOS commands such as DIR and TYPE, too cumbersome a tool for finding buried programs or files, and only nominally capable of handling routine jobs you otherwise must do in a DOS window or in File Manager.

> *Windows' File / Run looks convenient. Is there a way to get it off its fat butt to do something constructive?*

There it sits, only three keystrokes away (five if you're in a program). It sure *looks* convenient. Is there a way to get it off its fat butt to do something constructive? The answer is *absolutely*—and with only a little work. Using a few batch files and DOS commands, you can streamline File/Run so that it actually becomes productive. For instance, you can list and copy directories quickly, run any program on your hard drive without a lot of extra typing, and reduce daily tasks to a few keystrokes.

Here's an example. I store many of my text files on floppy disks. To get a listing of a disk, find the file I want, load my word processor, and load the file, I only have to do the following:

1. Press Ctrl+D.
2. Press the Enter key.
3. Type the name of the text file.

The trade-off for such convenience is flexibility; you have to hard-wire some shortcuts into your configuration. Also, you need to give some passing attention to how your hard drive is organized. But the investment in time is minimal. While all references here are to File/Run in Program Manager, these concepts apply equally to File Manager.

Internal DOS Commands

Our first task is to gain access to internal commands (which you can't run under Windows), with a few short batch files. This first one, DIRW.BAT, calls a directory listing:

```
@ECHO OFF
DIR %1
PAUSE
```

To run DIRW.BAT, first make sure it's in a directory included in AUTOEXEC.BAT's PATH statement. Then type the following in File/Run's Command box, optionally replacing *[pathname]* with the directory path:

```
DIRW [pathname]
```

DIRW accepts DIR's usual switches, such as /P (pause), /S (include subdirectories), and /B (brief listing). For example, to see a directory called C:\BAT \OLDBAT with a pause after each full screen, go to File/Run and type this:

```
DIRW \BAT\OLDBAT/P/S
```

The batch file replaces the variable %1 with the value \BAT\OLDBAT/P/S. Note that there's no space between the directory name and the switches. If you include a space, DOS will pass only \BAT\OLDBAT to the variable.

If you're used to including spaces and can't break the habit, add a few extra variables to the first line of the batch file: DIR %1 %2 %3 %4. When you type `DIRW \BAT\OLDBAT /P /S`, DOS fills %1 with \BAT\OLDBAT, %2 with /P, and %3 with /S; it ignores %4.

The PAUSE command in DIRW.BAT tells DOS to wait for a keystroke after listing the directory before you return to Windows. Otherwise, the directory would flash so quickly you wouldn't be able to read it.

You can apply the technique used with DIRW to any internal DOS command. For example, a batch file called RENAMEW.BAT, which renames a file, might look like this:

```
@ECHO OFF
RENAME %1 %2
PAUSE
```

RENAMEW.BAT uses the same syntax and switches as RENAME. Type this in File/Run's Command box:

```
RENAMEW [drive:][path]filename1 filename2
```

Other useful internal commands for which you can write batch files include COPY, DATE, TIME, MKDIR (or MD), TIME, TYPE, and VOL.

Again, make sure the batch files are in a directory included in AUTOEXEC.BAT's PATH statement. The most logical place is in your DOS directory. Also, it's bad form to give a batch file the same name as a DOS command, so make sure the filename is unique.

Free SUBSTition

The above method still requires that you type the full pathname to get a directory. You can streamline the process by using the DOS SUBST command to create virtual drives for your most-often-used directories. For instance, instead of typing out a subdirectory called C:\WP\CLUB\MINUTES, you might want to substitute drive D for that path.

The SUBST command goes into your AUTOEXEC.BAT file. For the example above, you'd include this line:

```
SUBST D: C:\WP\CLUB\MINUTES
```

Thereafter, the following command at File/Run will get you a directory of the MINUTES subdirectory:

```
DIRW D:
```

If you already have a drive D, use a drive letter you're sure isn't in use. And one warning about SUBST: Don't use it at a DOS prompt while you're running Windows. Make your drive assignments in AUTOEXEC.BAT and reboot.

Pausing External Commands

Although you can run external DOS commands from File/Run, certain ones won't work as is. Most troublesome are those that in DOS give you a screenful of data and then return to the DOS prompt. As with DIR, the information you get from such commands won't stay on screen long enough for you to read it.

ATTRIB is one example. When you type `ATTRIB` at the DOS prompt, you get a list of files in the current directory along with their attributions (characteristics such as whether it's a hidden or read-only file, or whether it has changed since your last backup). If you type `ATTRIB` at File/Run's command line, the list will come and go before you blink.

A batch file that would pause these long listings after each full screen of data might look like this:

```
@ECHO OFF
ATTRIB %1 |MORE
PAUSE
```

The pipe symbol and the MORE command (|MORE) pause the listings. MORE must be part of the batch file; you can't pass it to a variable the way you can a filename or switches.

Using File/Run to Run Programs

The next step is to get a better grip on finding and running our DOS programs. As is, File/Run makes running a DOS program more trouble than it's worth. For starters, you have to type the entire pathname. Worse, if you can't remember the filename, you have to use Browse, mousing laboriously through one miserable directory at a time.

There's a simple way to ensure that all your programs are readily accessible from File/Run. DOS users devised this technique years ago to liberate themselves from the tyranny of the PATH statement's 127-character limit. You run your programs from batch files and put the batch files into a subdirectory called BAT. Then you add the BAT subdirectory to AUTOEXEC.BAT's PATH statement. You can execute any program by typing the name of the batch file at File/Run's command line. For example, suppose you have a system-analysis utility called LOOKSEE.EXE in the subdirectory C:\UTILS\GENERAL. In your BAT subdirectory is a two-line file called LOOKSEE.BAT:

```
CD C:\UTILS\GENERAL
LOOKSEE
```

Whenever you type LOOKSEE at any command line, whether in the File/Run dialog box or a DOS window, Windows will start a DOS session and run LOOKSEE.BAT, which in turn will run LOOKSEE.EXE.

Associate Managers

Setting up specialized subdirectories is one DOS trick File/Run improves, thanks to its Associate option, which for practical purposes lets you run data files as though they were programs. For example, suppose you have a subdirectory called C:\123\BUDGETS, containing several dozen spreadsheets. If the subdirectory is in your PATH statement, you can bring up any spreadsheet by going to File/Run and typing the filename. For example, typing BUD94.WK1 automatically runs 123 with BUD94.WK1 already loaded.

To use this technique, you must first associate the extension, WK1, with its program, 123.EXE. Associate, which lives in File Manager's File menu, lets you link all data files with a specific extension to a specific program. In the example above, all spreadsheet files with the WK1 extension are linked to Lotus 1-2-3.

Once you've associated an extension, you can treat any data file with that extension as though it were the program itself. When you go to File/Run and type the data filename, Windows sees the extension and runs the associated program, which in turn brings up the data file automatically.

You can link any extension with any program, as long as the data file is compatible with the program. For example, say you use an LET extension for letters you write in WordPerfect. When you associate LET with the program WP.EXE, you can then load WordPerfect by running any file with the LET extension. (For more on Associate, see the "Windows Seat" column in *DOS World* #18, November 1994, page 70.)

So far, we've seen how File/Run can use batch and data files to run programs. There's another file type you can execute from File/Run—the program-information file, or PIF. When you've created a PIF for a DOS program, you can run the program by typing the name of the PIF. For example, typing `123.PIF` in File/Run's dialog box will execute 123.EXE. You don't need to worry about 1-2-3's subdirectory being in your PATH statement, since you specify the path in the PIF; just be sure the PIF is in an accessible directory, preferably \WINDOWS.

Windows Macros

The goal of every computerist is optimum efficiency, which means getting the most work with the least motion. Windows' optimizer is its Macro Recorder (in the Accessories group). It's essentially a giant keystroke capturer. It's a runt compared to the macro capabilities of many programs, but it's good enough to automate some procedures.

Let's step through an example. At the beginning of this article, I pressed Ctrl+D to get a directory of a disk in drive A and then typed the name of the text file I wanted to load. To create a macro for this procedure, make sure you have a disk in drive A and follow these steps:

1. Open the Recorder dialog box.
2. Choose Macro Record from the menu bar.
3. Enter a descriptive name (not subject to the eight-character DOS limit) and shortcut key for the macro and choose Start. Recorder returns to Program Manager.
4. Select File/Run.
5. Type `DIRW A:`. You'll see the contents of your disk flash on screen.
6. Press the Enter key to return to Program Manager.
7. Select File/Run.
8. Type `A:`, but this time don't press Enter.
9. Press Ctrl+Break. A dialog box pops up telling you that Recorder has been suspended. Choose the Save option.
10. Press Alt+Tab to return to Recorder.
11. Choose File/Save, type a filename for the macro, and press Enter. Windows saves the macro with an REC extension in your Windows directory.

The macro must be loaded before you can use it. It will load automatically if you put it into your StartUp group. Open StartUp, select File/New from the Program Manager menu bar, and click on Program Item. In the Command Line box, enter the name of the macro with its pathname: for example, C:\WINDOWS\ADRIVE.REC. Check Run Minimized. Click on OK, and an icon for your macro will appear in StartUp. Once the macro's loaded, press the shortcut key to use it.

The macro above runs DIRW.BAT, which lists a directory of the disk in drive A. Find the text file you want to run. The filename's extension must be associated with a program. When you press the Enter key, the macro returns to Program Manager and immediately opens File/Run again. For convenience, it inserts A: at the command line. Type the name of the filename and press the Enter key. Windows will run your word processor, which in turn will load the file you chose.

See? File/Run isn't a digital couch potato after all. With a little planning and a lot of help from DOS, File/Run can be a productive tool. ■

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DOS WORLD INDEX

DOS Resource Guide, now DOS World, published its first article index in issue #8; that index covered issue #1 and issues #3 through #7. (Issue #2 was a product guide and didn't contain articles.) The second index, published in issue #15, covered articles and columns that appeared in issues #8 through #14 and included three special issues: Buyer's Guide to Over 250 Utilities (Special #1, April 1993), The Essential Guide to DOS 6 (Special #2, October 1993), and Running DOS and Windows in Harmony (Special #3, February 1994).

The following index covers the four remaining issues of DOS Resource Guide: #15 (May 1994), #16 (July 1994), #17 (September 1994), and Maximum DOS (Special #4, June 1994). Future indexes will cover regular issues and specials published under the DOS World name. (See page 90 for information on obtaining back issues.)

ARTICLES

AUTHOR	ARTICLE TITLE	ISSUE	PAGE	DESCRIPTION
		DOS EXPLAINED		
Brothers	Tame Your Fussy Floppy Drives	*DRG*#17	21	Bridge the communication gap between yourself and your floppy drives, using DRIVER.SYS and the DRIVPARM command.
Johnson	Solving IRQsome Problems	*DRG*#17	26	Head off interrupt problems with MS-DOS 6.x's diagnostics utility, MSD.EXE.
Lowe	Drive Partitions Made Flexible	*DRG*#15	27	DoubleSpace helps set up several resizable compressed drives within a single disk partition.
Menefee	Using DOSKEY Command Macros	Spec.#4	47	DOSKEY macros eliminate the drudgery of repetitive DOS tasks and tame dangerous commands. Includes 27 macros for everyday computing.
		FILE AND DISK MANAGEMENT		
Brothers	The Three Faces of UNDELETE	*DRG*#16	24	The three levels of UNDELETE in DOS 6.x help pick up the pieces when you accidentally delete important files.
Goodman	Running in the Fast Lane	Spec.#4	25	Use BUFFERS, SMARTDRIV, DEFRAG, and DBLSPACE to manage data more efficiently and thus improve system performance.
Lowe	ScanDisk: An MS-DOS Self-Starter	Spec.#4	36	Good news: You can set up ScanDisk to check your hard disk for defects and fix problems automatically. (Correction, *DW*#18, p. 7.)
Lowe	ScanDisk Repairs Hard-Drive Data	*DRG*#16	28	DOS 6.2's new disk utility identifies surface defects and relocates files to safe areas.
Miastkowski	Tuning Up SmartDrive	Spec.#4	30	Tweaking DOS's disk-caching software may improve PC performance by as much as 200 percent.
Nelson	Find a Foolproof File-Naming Strategy	*DRG*#15	22	Developing a naming scheme is the key to keeping files on your hard disk organized.

AUTHOR	ARTICLE TITLE	ISSUE	PAGE	DESCRIPTION
Nelson	Move Over, COPY	*DRG*#15	36	Eliminate keystrokes by using 6.x's MOVE and DELTREE commands to move, rename, and delete files and directories.
SETUP AND CONFIGURATION				
Brothers	Making the Most of CONFIG.SYS	Spec.#4	7	To create the best atmosphere for your computing sessions, try refining—and redefining—your configuration file.
Brothers	How to Streamline AUTOEXEC.BAT	Spec.#4	17	Reap the benefits of fine-tuning AUTOEXEC.BAT: faster program execution, more free conventional memory, and a more colorful, informative DOS prompt.
MEMORY MANAGEMENT				
Goodman	Curing Short-Term Memory Maladies	*DRG*#17	44	When to upgrade RAM, how much memory to add, and what types of chips to choose.
Gookin	Maximum Memory, Minimum Fuss	Spec.#4	22	DOS 6.x's MemMaker program does all the work of freeing RAM while you sit back and watch.
BATCH FILES				
Brothers	Common Problems, Uncommon Solutions	*DRG*#15	39	Novice, intermediate, and advanced batch-file solutions for starting up the right application.
Brothers	Turn Up the Volume	*DRG*#17	34	Beef up DOS's batch-file language with a few easy-to-use QBasic tools.
Brothers	What FOR-IN-DO Can Do for You	*DRG*#16	36	With FOR-IN-DO and a little creativity, you can compress dozens of batch commands into a single line.
Hummel	How to Customize Your Keyboard	*DRG*#16	32	These three Debug scripts let you create batch files that reroute and redefine keys or swap functions.
Hummel	How to Win the Numbers Game	*DRG*#15	32	KEYID instantly provides ASCII-code equivalents you can use in your batch files. (Correction to listing, *DRG*#16, p. 4.)
Hummel	Put Some Life Into Your Batch Files	*DRG*#17	30	GOTOROW and SAYAT let you write batch files that scroll up and down, and position text or the cursor anywhere on screen.
Lowe	Pros' Choice: A Wealth of Options	*DRG*#17	39	Introduced in DOS 6, CHOICE makes it oh-so-easy to create complex batch-file menus.
Oatley	Let DOS Reroute Your Input and Output	*DRG*#15	44	One user's search for a batch file to locate executable programs reveals the potential and the shortcomings of piping and redirection.
Wolfskill	Out of Sight, Out of Mind?	Spec.#4	41	MAINT62.BAT and its companion QBasic program, MAINT62.BAS, remind you to run your disk-maintenance utilities, then handle the details.
Wolfskill	Menus à la Carte	*DRG*#16	40	QBMENU.BAS prompts you to supply your menu choices and commands, then builds a colorful batch-file menu automatically.
PROGRAMS AND PROGRAMMING				
De Pasquale	The Search Is On	*DRG*#15	54	Reusable linear and binary search functions provide a quick way to retrieve information from a QBasic array.
De Pasquale	Sorting It All Out	*DRG*#17	62	SORT.BAS lets you use a bubble or a shell sort to rearrange text and numbers within a QBasic array.

AUTHOR	ARTICLE TITLE	ISSUE	PAGE	DESCRIPTION
Lowe	Mad Bomber	*DRG*#17	56	BOMBER.BAS challenges you to find all 15 explosive charges hidden in the game's 10-by-10 grid.
Weber	Part II: More Programming Power to You	*DRG*#15	58	Use this all-purpose assembly-language routine to make use of the hundreds of DOS and BIOS services built into your PC.

USING PC SOFTWARE

AUTHOR	ARTICLE TITLE	ISSUE	PAGE	DESCRIPTION
Badgett and Sandler	The 2nd Annual Guide to Utility Software	*DRG*#16	48	Updated and expanded, this compendium tells you what the more than 300 programs do, how much they cost, and where to order them. (Correction *DW*#18, p. 7.)
Miastkowski	What's New in DOS "Oldies"	*DRG*#15	48	Recent upgrades give classic DOS programs a new lease on life.

GENERAL COMPUTING HELP

AUTHOR	ARTICLE TITLE	ISSUE	PAGE	DESCRIPTION
Bryan	Understanding Your PC's BIOS	*DRG*#17	51	Knowing how the BIOS mediates between hardware and software helps you troubleshoot system failure.
DeTray	The Maximum Disk for Maximum DOS	Spec.#4	88	No need to type in Spec.#4's programs, because the Companion Disk contains them all. Shareware bonus: 4DOS 5.0, HyperDisk SpeedKit 4.65, and LIST Plus 9.0e.
Hummel	Maximum DOS Toolkit	Spec.#4	53	This collection of 31 batch programs, Debug scripts, and clever command techniques makes your computing time more productive. (Correction, *DRG*#16, p. 4; correction to listing *DW*#18, p. 7.)

GOOKIN ON DOS

COLUMNS

AUTHOR	ARTICLE TITLE	ISSUE	PAGE	DESCRIPTION
Gookin	Make Windows Roll Over and Play DOS	*DRG*#15	15	Windows gives you three ways to run DOS programs. Take your pick.
Gookin	Living Comfortably with DOS Programs	*DRG*#16	20	Learn to switch between DOS programs and Windows, copy information between the two, and more.
Gookin	Cool DOS Utilities	*DRG*#17	15	The suite of programs in 6th Sense presents newfangled ways of getting DIR and FORMAT to do your bidding. Its DOSKEY macros are a bonus.

SHAREWARE EXCHANGE

AUTHOR	ARTICLE TITLE	ISSUE	PAGE	DESCRIPTION
Brothers	Make a Clean Sweep	*DRG*#15	88	Aris Edit Lite 1.1, SNAPSHOT 1.10, and ArcMaster 9.8.
Brothers	Utility Infielders	*DRG*#16	96	IDE Identify 1.40, Deadwood 1.00, and PATHA 2.2.
Brothers	A Handy Batch of Batch Enhancers	*DRG*#17	88	BATMNU 2.3, BTX 1.0, and A Batch View 1.1.

WINDOWS SEAT

AUTHOR	ARTICLE TITLE	ISSUE	PAGE	DESCRIPTION
Maloney	A Tale of Two DOS Prompts	*DRG*#17	74	Preserve precious memory by creating one DOS-prompt PIF for running DOS commands and another for running larger programs.

How to Use

REPLACEABLE TEXT

Articles in *DOS World* will often give you a command that includes text you must replace with your own information. This replaceable text is in italics. For example, in the following command, you'd replace *filename* with the name of your own file:

```
COPY A:filename B:filename
```

THE AUTOEXEC. BAT FILE

Most people have a batch file called AUTOEXEC.BAT on their hard disk. If you want to look at it, first go to your root directory by typing `CD\`. Type `DIR` to make sure AUTOEXEC.BAT is there. Then type the following command:

```
TYPE AUTOEXEC.BAT | MORE
```

A simple AUTOEXEC.BAT file might look like this:

```
@ECHO OFF
PROMPT $P$G
PATH=C:\DOS;C:\WINDOWS;C:\WP51;C:\BAT
C:\DOS\SMARTDRV.EXE
C:\MOUSE\MOUSE.COM
C:\DOS\DOSKEY.COM
SET TEMP=C:\TEMP
```

When a *DOS World* article instructs you to modify your AUTOEXEC.BAT file, always make a backup copy of the original AUTOEXEC.BAT first. The most common names for your backup copy are AUTOEXEC.BAK or AUTOEXEC.BK. The latter lets you save different versions of your backups—for example, AUTOEXEC.BK1 and AUTOEXEC.BK2. You create a backup copy with the following command:

```
COPY AUTOEXEC.BAT AUTOEXEC.BAK
```

Also, you should have an emergency boot disk available whenever you modify AUTOEXEC.BAT. (See the accompanying section on the facing page, top.) It will let you access your hard drive in case you make an error that locks up your computer. Changes you make to AUTOEXEC.BAT won't take effect until you restart your computer.

THE CONFIG.SYS FILE

You also have a file in your root directory called CONFIG.SYS. Like AUTOEXEC.BAT, this file is in ASCII, and you can view your CONFIG.SYS file with the TYPE command. A typical CONFIG.SYS might look like this:

```
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE NOEMS
DOS=HIGH,UMB
FILES=50
BUFFERS=10
SHELL=C:\DOS\COMMAND.COM
  C:\DOS\ /E:1024 /P
DEVICE=C:\DOS\ANSI.SYS
DEVICE=C:\DOS\SETVER.EXE
```

The rules for handling CONFIG.SYS are the same as they are for AUTOEXEC.BAT: Always back up the original file before you modify it and always have an emergency boot disk available. As with AUTOEXEC.BAT, changes you make to CONFIG.SYS won't take effect until you restart your computer.

BATCH FILES

A batch file is a text file that tells MS-DOS to do a series of tasks. The filename of a batch file always ends with the extension .BAT.

A batch file must be in plain-text format. For example, a batch file might consist of the following lines:

```
CD\
DIR /S /P
```

This batch file moves you to the root directory (CD\) and then gives you a list of all files in all directories (/S), pausing after each full screen (/P).

Every batch file needs a name. In such cases, you should pick your own name. Batch-file names carry the same limitations as any other DOS filename; you're limited to eight characters, plus a three-character extension. A batch-file name must always use the .BAT extension.

To avoid confusion and unexpected results, don't give any batch file the same name as another program or DOS command. For example, VCOPY.BAT is an acceptable name for a batch file, but not COPY.BAT or XCOPY.BAT, because COPY and XCOPY are the names of DOS commands. To run or execute a batch file, type its name at the DOS prompt. For example, to run a batch file called VCOPY.BAT, type `VCOPY` at the DOS prompt.

Creating and Saving

Using EDIT. If you have DOS 5 or later, you can create a batch file using EDIT. EDIT usually resides in your DOS directory. Type `EDIT` and enter your batch file. When you're done, press Alt+F and choose the Save option. Type the name of your batch file (make sure you add the extension .BAT) and press the Enter key.

Using other word processors. Most word processors don't save files in plain text; they include other characters, such as control characters that handle such matters as page formatting and typefaces. Most word processors, however, do give you an option to save in plain text. The procedure varies from one word processor to the next. For example, when you save a file in WordPerfect 5.1, you choose ASCII Text (DOS) as your Format option.

ANSI.SYS AND THE ESCAPE CHARACTER

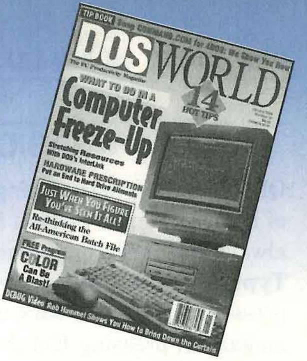
When an article says you must have ANSI.SYS installed, it means that the MS-DOS file ANSI.SYS should be in your DOS directory, and the following line should be in your CONFIG.SYS file:

```
DEVICE=C:\DOS\ANSI.SYS
```

Some articles that discuss ANSI.SYS will also ask you to create a batch file that uses the escape character. Unfortunately, there's no uniform method of doing so. If you use EDIT, the text editor that comes with MS-DOS, you can make an escape character by pressing Ctrl+P and then the Esc key. The escape character appears on screen as a small left-pointing arrow.

If you're using another text editor or word processor, check its instructions for information on how to enter the escape character.

This Magazine


DOS WORLD
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COLOR Can Be A Blast!

MAKING AN EMERGENCY BOOT DISK

Sometimes a *DOS World* article will suggest that you create a *bootable floppy*—a floppy disk that serves as an emergency system disk. That is, if your computer for some reason can't access your hard drive, you can start your computer from the emergency floppy. You should always have an emergency system disk available, but it's particularly important when you modify AUTOEXEC.BAT or CONFIG.SYS because you may change those files in such a way that your computer won't start from the hard drive. To create a system disk:

1. **Insert a floppy disk in drive A.**
2. **At the command line, type FORMAT A: /S (all existing information on the floppy will be lost).**

DOS first formats the floppy disk. Then it copies three DOS system files to the floppy disk: IO.SYS, MSDOS.SYS, and COMMAND.COM.

The first two are hidden files; you won't see them if you type DIR A:. If you have the disk-compression program DoubleSpace on your computer, the FORMAT command above will also copy DBLSPACE.BIN, a third hidden file, to the floppy disk.

After you've created your system disk, you should copy a few other basic files to your floppy.

Go to your DOS directory and copy the following files: FORMAT.COM, EDIT.COM, EDIT.HLP, QBASIC.EXE, UNDELETE.EXE, CHKDSK.EXE, and FDISK.EXE.

DEBUG SCRIPTS

A Debug script is a list of assembly-language instructions you convert to an executable program using the Debug program in your \DOS directory.

Creating the script. A Debug script must be in plain text. The procedure for creating the script is the same as for creating a batch file. You can use DOS's EDIT program, or you can use a different text editor or word processor and save the script in plain text format.

Creating an executable program. After creating and saving the script, type the following command at the DOS prompt:

```
DEBUG < filename
```

where *filename* is the name of the Debug script you created. For example, if the name of your Debug script is KEYPRESS.SCR, you'd type this line:

```
DEBUG < KEYPRESS.SCR
```

at the DOS prompt. The executable program created by Debug will have the extension .COM. The name of the executable file is determined by the contents of the script. Our convention is to use the same name for the executable file as we do for the script. Thus, the executable file created by KEYPRESS.SCR will be named KEYPRESS.COM. Once you've created the executable file, you run it by typing its name at the DOS prompt. To run KEYPRESS.COM, type `KEYPRESS`.

PATHS AND THE PATH STATEMENT

DOS World articles often tell you to make sure that a particular file is in a directory included in your PATH statement. This lets you runs a .COM, .EXE, or .BAT file from any directory on any drive.

For example, an author might tell you to create a batch file called TEST.BAT, put it into a subdirectory called \BAT, and put the subdirectory into your PATH statement. You can then execute TEST.BAT by typing `TEST` from anywhere on your drives, without having to change to the \BAT directory first.

The PATH statement is a line in your AUTOEXEC.BAT file. It gives DOS a list of directories to search for requested files. Here's an example:

```
PATH=C:\DOS;C:\WINDOWS;C:\BAT
```

When you type `TEST` at the DOS prompt, DOS looks for the program first in the current directory, then in the root directory, and then, in order, the \DOS, \WINDOWS, and \BAT directories. When it finds TEST.BAT in the \BAT directory, it executes the batch file.

Continued on page 80

BASIC DEFINITIONS

DOS prompt. Also known as the *command prompt*. By default, the DOS prompt looks like this: C:\>. This is where you type the instructions to run programs or DOS commands.

Boot, boot up, reboot. The process of starting or restarting your computer. Turning on your computer is *booting* or *booting up*. Pressing the key combination Ctrl+Alt+Del restarts, or *reboots* your computer. So does pressing the reset button, if your computer has one.

Extensions. When we refer to a program by its common name (for example, the DOS command FORMAT) without an extension, you can assume that the extension is .COM or .EXE. When we refer to a batch file, we always include the extension .BAT. QBasic program names must always include the .BAS extension.

ASCII. American Standard Code for Information Interchange. For our purposes, an ASCII file is a plain text file, one that consists entirely of the characters you see on your keyboard.

Directories. Your hard drive has a main directory called the *root* or *home* directory. Directories created off the root directory are called *subdirectories*. When we provide the name of a subdirectory, it will look something like this: \WORD\FILES. Here, the root directory has a subdirectory called WORD, which in turn has a subdirectory called FILES.

File placement. We assume that the following files are in your root directory: AUTOEXEC.BAT, CONFIG.SYS, and COMMAND.COM. We also assume that your DOS files are in a DOS subdirectory, usually called \DOS.

Keystroke combinations. When you should hold down one key while pressing a second, we indicate it this way: Alt+F4 (press the Alt key and hold it down while you press the F4 key). When you should press one key, release it, and press another, we indicate it this way: Alt, F4 (press the Alt key, release it, then press the F4 key).

QBASIC PROGRAMS

QBasic is the programming language included in all versions of MS-DOS since version 5. The name of a QBasic program always ends with the extension .BAS.

Typing in the listing. Type `QBASIC` at the DOS prompt and press Enter to start. Now type in the listing as printed in the magazine, pressing Enter at the end of each line. Note that when a line in the listing is indented two spaces from the line above it and doesn't start with a QBasic command or keyword, it's a continuation of the previous line. Other indentations, or none at all, indicate the start of a new line.

Subroutines and functions. QBasic listings often include subroutines and functions, and typing them is confusing at first. They begin with a line containing the keyword SUB or FUNCTION. Note that when you type a SUB or FUNCTION line and press Enter, all other lines you've typed will disappear from view. This can be disconcerting for beginning programmers. There's nothing to worry about—your listing is safe. To avoid screen clutter, QBasic simply hides other parts of your listing when you're typing in a subroutine or function. To see the other parts of your program, open the View menu at the top of the QBasic screen, then select SUBS. The SUBS dialog box will appear, letting you select the part of the program listing you want to view.

Saving a listing. Save your partially completed listing as you go along, rather than waiting until you've typed in the whole thing. To save, open the File menu, choose Save, and type in a filename when QBasic prompts you. We suggest using the filename specified in the magazine article. Subsequent saves of your listing won't prompt you for a filename, but will instead use the filename indicated the last time you saved the listing.

Running a program. After you've typed in the entire listing and saved it a final time, you can run the program by selecting Start from the Run menu or pressing Shift+F5. If QBasic finds an error, it will stop the program and highlight that line. To run a QBasic program (a .BAS file) stored on your hard drive, start QBasic, then select Open from the File menu. Choose from among the .BAS files displayed in the open dialog box to load the program into QBasic, then select Start from the Run menu or press Shift+F5.

DOS World BBS. Typing and debugging a long listing is time-consuming. If you have a modem, our listings are always available on *DOS World*'s bulletin-board system (BBS) at 603-924-3181. There are no connect-time charges; you pay only for the phone call. Set your communication program to 8 data bits, no parity, 1 stop bit (8, N, 1). Dial the number and wait for the "Connect" message. If you're a first-time user, the system will ask you to enter your name and choose a password. Then it will display a general information screen, followed by a questionnaire requesting your address, phone number, and so on, so that we may set up your account. From this point, on-screen prompts are the same for all users. A series of messages present the latest BBS news; press Enter after each message to go to the next screen. From the Bulletin Menu, Bulletin #1 offers information on navigating the Main and File Menus, with instructions for listing, marking, searching for, and downloading files. ■

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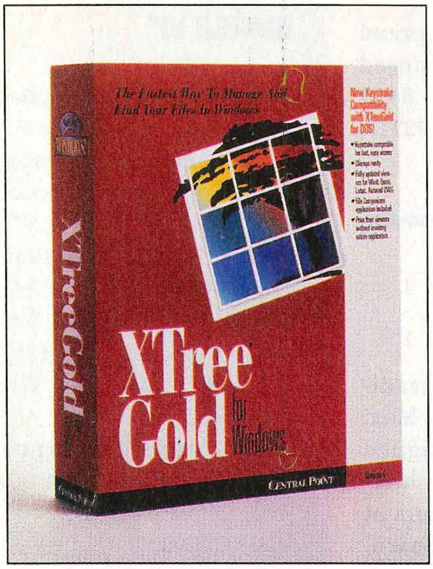
Totaal*, *Computable (CW)*, *LAN Magazine*, *MacWorld*, *Totaal "Windows"*; NEW ZEALAND's *Computer Listings*, *Computerworld New Zealand*, *New Zealand PC World*; NIGERIA's *PC World Africa*; NORWAY's *Computerworld Norge*, *C/World*, *Lotusworld Norge*, *Macworld Norge*, *Networld*, *PC World Ekspress*, *PC World Norge*, *PC World's Produktguide*, *Publish & Multimedia World*, *Student Data*, *Unix World*, *Windowsworld*; *IDG Direct Response*; PANAMA's *PC World Panama*; PERU's *Computerworld Peru*, *PC World*; PEOPLE'S REPUBLIC OF CHINA's *China Computerworld*, *China Infoworld*, *PC World China*, *Electronics International*, *Electronic Product World*, *China Network World*; IDG HIGH TECH BEIJING's *New Product World*; IDG SHENZHEN's *Computer News Digest*; THE PHILIPPINES' *Computerworld Philippines*, *PC Digest (PCW)*; POLAND's *Computerworld Poland*, *PC World/Komputer*; PORTUGAL's *Cerebro/PC World*, *Correio Informatico/Computerworld*, *MacIn*; ROMANIA's *Computerworld*, *PC World*; RUSSIA'S *Computerworld-Moscow*, *Mir-PC*, *Sety*; SLOVENIA's *Monitor Magazine*; SOUTH AFRICA's *Computer Mail (CIO)*, *Computing S.A.*, *Network World S.A.*; SPAIN's *AmigaWorld*, *Computerworld Espana*, *Communicaciones World*, *Macworld Espana*, *NeXTWORLD*, *Super Juegos Magazine (GamePro)*, *PC World Espana*, *Publish*, *Sunworld*; SWEDEN's *Attack*, *ComputerSweden*, *Corporate Computing*, *Lokala Natverk/LAN*, *Lotus World*, *MAC&PC*, *Macworld*, *Mikrodatorn*, *PC World*, *Publishing & Design (CAP)*, *DataIngenjoren*, *Maxi Data*, *Windows World*; SWITZERLAND's *Computerworld Schweiz*, *Macworld Schweiz*, *PC Katalog*, *PC & Workstation*; TAIWAN's *Computerworld Taiwan*, *Global Computer Express*, *PC World Taiwan*; THAILAND's *Thai Computerworld*; TURKEY's *Computerworld Monitor*, *Macworld Turkiye*, *PC World Turkiye*; UKRAINE's *Computerworld*; UNITED KINGDOM's *Computing/Computerworld*, *Connexion/Network World*, *Lotus Magazine*, *Macworld*, *Open Computing/Sunworld*; UNITED STATES' *AmigaWorld*, *Cable in the Classroom*, *CD Review*, *CIO*, *Computerworld*, *Desktop Video World*, *DOS World*, *Electronic Entertainment Magazine*, *Federal Computer Week*, *Federal Integrator*, *GamePro*, *IDG Books*, *Infoworld*, *Infoworld Direct*, *Laser Event*, *Macworld*, *Multimedia World*, *Network World*, *NeXTWORLD*, *PC Letter*, *PC World*, *PlayRight*, *PowerPC World*, *Publish*, *SunWorld*, *SWATPro*, *Video Event*; VENEZUELA's *Computerworld Venezuela*, *MicroComputerworld Venezuela*; VIETNAM's *PC World Vietnam*.



A DOS command line now complements Windows' pull-down menus in the newly released XTree Gold 4.0 file manager for Windows.

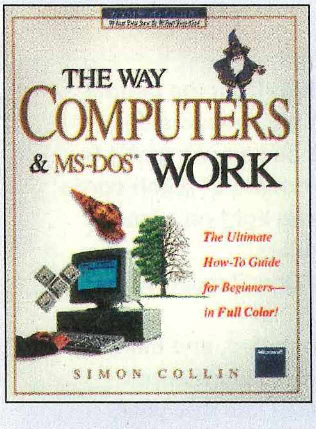
"Wait, Doctor, We Have a Pulse"

Contrary to the forecasts (wishes?) of some high-tech gurus, DOS still has plenty of life left. That point was driven home in late 1994 after dedicated DOS users—still about 110 million strong—prompted Central Point Software to abandon its all-Windows version of the XTree Gold file manager. In response, Central Point has developed a compromise DOS/Windows interface, reinstating the DOS command line to complement Windows' pull-down menus, in its newly released XTree Gold 4.0 for Windows.

XTree Gold 4.0 for Windows, $99.95; in-box rebates–$25 for owners of previous versions of XTree Gold and $10 for PC Tools Pro/The Norton Utilities owners. Central Point Software, 15220 N.W. Greenbrier Parkway, Suite 200, Beaverton, OR 97006; 800-333-6561.

From the Bookshelf: Read It and Reap

For anyone just beginning with computers, or for any user looking for a quick and easy reference on DOS basics, Microsoft Press has released the revised edition of ***The Way Computers & MS-DOS Work*** ($19.95). First published in 1993, the book's 128 pages are loaded with four-color illustrations and photos, tips, and screen shots, with the journey led by a cartoon-like WYSIWYG (what you see is what you get) wizard. With simplified text designed for a quick grasp of basic computing, the book swiftly yet thoroughly takes readers from unpacking their PCs and identifying cords, ports, and cables, to two chapters on how to put DOS to work. Toothy material in a down-to-earth format includes locating lost files, using wildcards, organizing a hard disk with DEFRAG.EXE, and understanding floppy-disk compression.

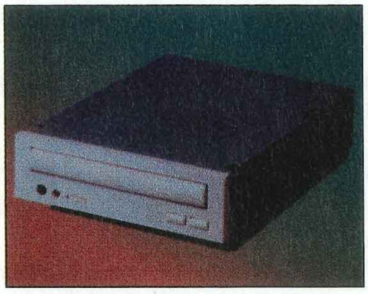

THE WAY COMPUTERS & MS-DOS WORK
The Ultimate How-To Guide for Beginners— in Full Color!
SIMON COLLIN

The Way Computers & MS-DOS Work, by Simon Collin; 1994, Microsoft Press, One Microsoft Way, Redmond, WA 98052-6399; 800-MS-PRESS. $19.95.

Plug and Play IDE: A Great Idea

Several CD-ROM manufacturers have introduced drives billed as purely plug-and-play (although at least one model on the market still requires what it calls "a simple software setup program").

For less than $200, you can buy a drive that plugs into an unused integrated drive electronics (IDE) cable connected to your computer's hard drive —without having to add sound or controller cards. Drives typically require a 386 or greater PC, DOS 3.1 or greater, and at least 20MB of free hard-disk space.



ALR Digital Express CDE-1200 CD-ROM drive.

UPGRADES, ETC.

- Ontrack Computer Systems' **Disk Manager 6.03** provides an enhanced driver for IDE hard disks larger than 528MB. Upgrades are $25; complete package is $124.95. Ontrack Computer Systems, 6321 Bury Drive, Eden Prairie, MN 55346; 800-752-1333 or 612-937-1107.

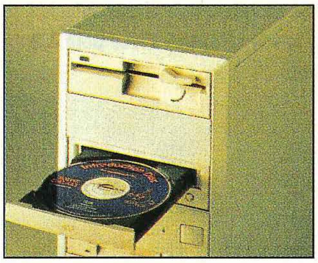
- **PC-Build Computers**, which offers upgrades for IBM XTs and 8088-based computers, has released its new catalog. For your copy, contact PC-Build Computers, 30 Wexford St., Needham, MA 02194; 617-449-7575 or 800-798-6363.

* Menu sorting, user-defined help boxes, LAN support, and a password-protected screen blanker/lock are some of the new features of **EZ-Menu 6.0**. Upgrades begin at $24.95; new package is $69.95. Progressive Computer Services, P.O. Box 7638, Metairie, LA 70010; 504-831-9717.

- Version 3.0 of the text-retrieval program **dtSearch** includes unlimited indexing capacity, scrolling word list, ability to create hypertext-linked databases, and tagging of multiple files to copy, print, or search. dtSearch for DOS and dtSearch for Windows are both $149; a DOS/Windows combo package is available for $199. DT Software, 2101 Crystal Plaza Arcade, Suite 231, Arlington, VA 22202; 703-413-3670 or 800-483-4637 for orders.

- Enhancements to Sirius Payroll Module for **Sirius Business Accounting version 3.2** include printing of W-2 and 941 forms; worker's compensation expanded to 800 code; new year-end payroll procedure. For those owners who signed the upgrade license agreement, the updated version is free. New package retails for $395. Sirius Software Inc., 345 West 2nd St., Suite 201, Dayton, OH 45402-1443; 513-228-4849 or 800-788-4849.

Models you may want to check out include the **Aztech CDA 268-031**, priced at $149, from Aztech Labs Inc., 47811 Warm Springs Boulevard, Fremont, CA 94539, 800-822-8884; and the **ALR Digital Express CDE-1200**, priced at $149, from Advanced Logic Resource Inc., 8401 Jeronimo, Irvine, CA 92718, 800-444-4ALR.



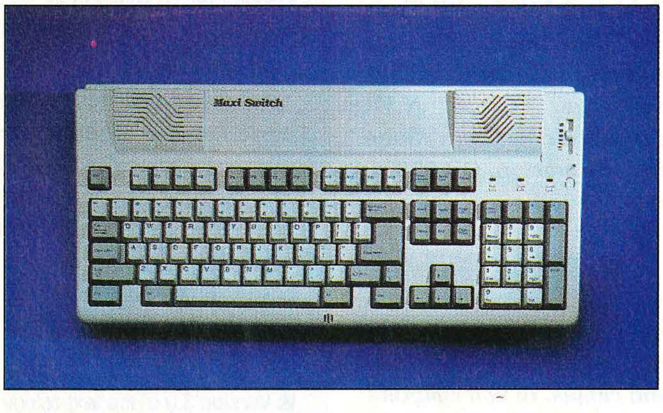
Aztech CDA 268-031 plug-and-play CD-ROM drive.

Adding Sound Can Be a Rhapsody in DOS

Adding a sound card to your PC usually means having to find room for external speakers. An alternative about to enter the playing field is Maxi Sound, a sound-enabled keyboard for 386 and 486 machines.

In addition to a traditional 101-key layout, Maxi Sound has been designed with built-in, audiophile-quality stereo speakers at the top of the keyboard; jacks in the back for headphones, auxiliary speakers, or hook-up to your stereo system; a built-in omnidirectional microphone; and volume control at the keyboard—and all without any additional memory requirements.

Maxi Sound, $99; Maxi Switch, 2901 East Elvira Road, Tucson, AZ 85706; (602) 746-9378.



Built-in audiophile speakers at the top of the keyboard highlight Maxi Sound's sound-enabled capabilities.

THAT'S WHAT THEY SAID

"I think PC manufacturers should take a hint from the people who make stereo components. Why can't we have a rack-mounted PC? Why can't reconfiguring be as easy as going to the front of your computer and moving a couple of patch cords around? Why can't an IRQ show up as a red light on a front panel? Talk about saving tech-support dollars!"

—Columnist Doug Linder, *InfoWorld*

"For years, PCs have been shipping with Windows preinstalled, and millions of people don't know anything else—and really don't care to learn about DOS . . . . When Microsoft ships Windows 4.0 [Windows95] late this year, DOS will officially be dead."

—Columnist Charles Brannon, *CD-ROM Today*

"There will be DOS diehards until we get [*Star Trek*] transporter technology."

—Chris Randles, Software Publishing Corp., *PC Week* interview

"Which operating system is better, CP-M or this new MS-DOS?" "Is there a word processor I can get without all these complicated control-key commands?" "What about the new hard disks? How do I add one to my system?"

—*CompuServe* magazine, reporting on questions posted ten years ago by members of IBMNET forums

BUNDLE UP

■ Diamond Multimedia Systems is bundling the CorelDraw 3 (Corel Corp.) graphics program with five of its graphics accelerators: **SpeedStar 64** (1MB, $189; 2MB, $249), **Stealth 64 DRAM** (1MB, $189; 2MB, $249), **Stealth 64 VRAM** (2MB, $399; 4MB, $599), **Viper SE** (2MB, $379; 4MB, $579), and **Viper Pro Video** (2MB, $479; 4MB, $679). Diamond Multimedia Systems, 1130 East Arques Ave., Sunnyvale, CA 94086; 408-736-2000.

TO YOUR (PC's) HEALTH

■ **AMIDiag**, a $49.95 diagnostic software package for your computer, comes with more than 200 diagostic tests and nine system-information functions. Vertisoft Systems Inc., 153-B Grace Drive, Easley, SC 29640; 800-685-6244 for orders; 800-466-5875 for customer service.

■ For $29.95, **Dr. Know**, from Dilloware Inc., analyzes your computer and displays an on-screen chart of your system's components: processor, mouse, monitor type, BIOS date, DOS version, available hard-disk space and memory, and more. Dilloware Inc., 1395 Bear Creek Road, New Braunfels, TX 78132; 210-899-2100 or 800-880-0887.

■ **Buttons for DOS** ($29 + $1.50 for shipping) offers "novice-friendly" ways to create alternate start-up configurations and to run RAM-eating games without resorting to a boot disk or performing surgery on your AUTOEXEC.BAT. It also offers point-and-click access to DOS utilities such as ScanDisk when working in Windows. Triad Software, P.O. Box 1299, Sequim, WA 98382; 206-683-3202 or 800-683-3202.

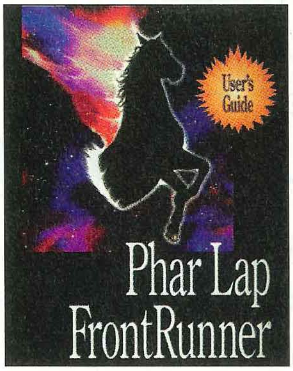
FRONTRUNNER 1.3

Twin Tweaks

While FrontRunner offers no real improvement over Windows' Program Manager, its batch-language extensions and command-shell windows will hit the mark with many DOS power users.

by Alan Zeichick

Phar Lap Software's FrontRunner is designed as a substitution for Windows' Program Manager—one targeted to appeal to DOS power users who hate giving up the C:> command prompt. But if you're looking for a high-performance tool to replace Windows' program launcher, FrontRunner offers only minor tweaks and no real improvement.



FrontRunner, however, does include extensions to DOS's batch language to allow interaction with Windows. They're FrontRunner's best features, and can be quite beneficial if you run lots of batch files that need user interaction.

For example, if you want your batch file to work on a particular disk file, you can call up a Windows "open file" dialog box to select a file graphically; your system returns the selected file's name to the batch file for appropriate processing. Other extensions let batch programs use the Clipboard, get text input through a dialog box, launch Windows apps (in the foreground or background, your choice), and play sound files (oh boy!).

A Window Pain

Other tweaks for DOS power users are FrontRunner's command-shell windows. Opening a command shell is like running a DOS session in a graphics window. (To simulate one, press Alt+Enter when running a full-screen DOS session.) Problem is, the command shell is always physically inside the FrontRunner window—a serious disadvantage, because you can't move the shells around your screen.

The advantage, however, is that your system keeps a history, so that you can scroll up and look at the results of previous DIR commands and the exit screens of text-mode DOS programs. Another advantage is that you can launch Windows programs from a command shell. (For example, you can type WINWORD at the C:> prompt to start Word for Windows.)

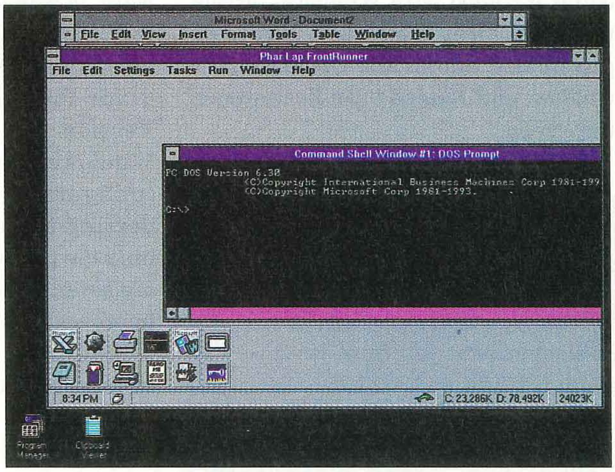
Frankly, I didn't find that enough of an advantage to offset the forced position of the command shell, and the fact that graphical DOS sessions always run much more slowly than full-screen sessions. I just didn't use this feature much at all. Oh, and you can run a DOS program by dragging its icon over from File Manager and dropping it onto a command shell. Big deal.

FrontRunner, like Program Manager, displays one resizable window on screen, and presents you with the opportunity to run programs by clicking on their icons. While FrontRunner goes beyond Program Manager by offering a variety of useful features, few of them are perfectly implemented, and many don't offer real functionality beyond Program Manager.

If you don't like opening up Program Manager's program groups and hunting for the right program to launch, you can stash frequently stored programs in FrontRunner's handy launch bar. Unfortunately, it's tedious to load programs from the launch bar. If you want to install DOS programs onto the launch bar, they end up with a generic icon; adding a custom icon requires exactly the same lengthy and unintuitive procedure as Program Manager.

Group Grope

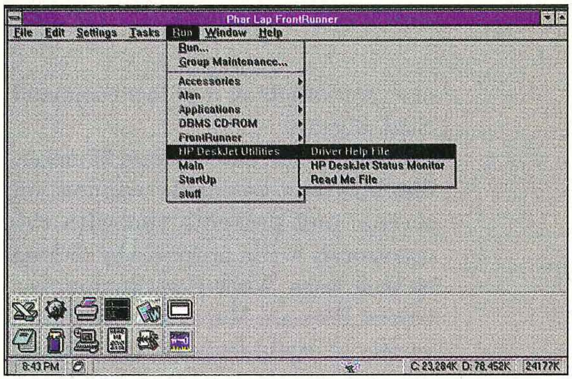
FrontRunner still uses the same program group metaphor as Program Manager, but also offers tools for manipulating the groups. If you're trying to search quickly through groups for a program, you can traverse menus instead of icons. But if your program group includes more than 32 icons (at least on my 800-by-600 display


Microsoft Word - Document2
File Edit View Insert Format Tools Table Window Help
Phar Lap FrontRunner
File Edit Settings Tasks Run Window Help
Command Shell Window #1: DOS Prompt
8:34 PM
C 23,286K D: 78,492K
24023K
Program Manager
Clipboard Viewer

```
PC DOS Version 6.30
          (C)Copyright International Business Machines Corp 1981-199
          (C)Copyright Microsoft Corp 1981-1993.

C:\>
```

FrontRunner's menu bar, launch pad with icons, and status bar. Note that the command-shell window can't extend outside FrontRunner's window. You can have multiple command shells active at one time.



FrontRunner's Run menu lets you see the contents of Program Manager's icon groups alphabetically, rather than graphically, which helps you find programs faster. You can see the animated fish splashing in the water, at the bottom of the screen.

system), you need to pull up a separate dialog box, defeating the purpose of the exercise.

Phar Lap is proud of the configurable status bar at the bottom of FrontRunner's window. It can hold an alarm clock, show amount of free disk space and RAM, and let you know whether you have any new mail. Indeed, that's useful. Other options, however, are cute but silly: an animated fish swimming back and forth, a constant display of the mouse's *x* and *y* coordinates, and a "ticker tape" display of the contents of a text file.

If you're running full-screen DOS or Windows applications, the status bar is hidden anyway. Although FrontRunner includes tools and documentation for writing your own status-bar tools, don't even think about it unless you're an experienced C++ programmer.

I almost forgot: FrontRunner includes what Phar Lap calls "text windows," similar to the Notepad text editor included with Windows—except that FrontRunner's tools must run physically inside the FrontRunner window, and Notepad can float around the screen.

After several weeks of probing this program, I simply can't seem to find enough to justify spending $139 to replace Windows' Program Manager with a tool that doesn't make me any more productive. After all, Windows already offers a number of its functions. It lets you run DOS prompts in a graphics window, for example. Windows also comes with a text editor, and you can easily simulate the launch bar for free by placing frequently used programs into one Program Manager program group. (I've been doing that for years.) ■

Alan Zeichick is editorial director of Miller Freeman's CADENCE *magazine, and a daily user of DOS, Windows, OS/2, and the Macintosh. He lives in San Francisco.*

FrontRunner 1.3
List price: $139
Phar Lap Software Inc.
60 Aberdeen Avenue
Cambridge, MA 02138
617-661-1510, fax 617-876-2972
requires 386 PC with Windows 3.1 or later, 1MB RAM, 2MB hard-disk space

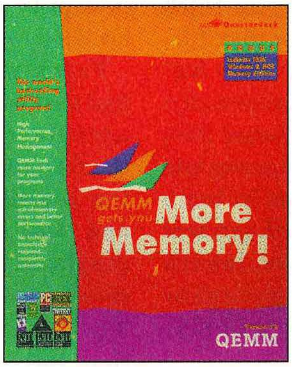
QEMM 7.5

Memories Worth Keeping

QEMM 7.5 may be marketed to Windows enthusiasts, but DOS users who want more conventional memory for their programs will like it, too.

by Ken Johnson

While QEMM 7.5, the new release of Quarterdeck Office Systems' flagship memory-management software, is being marketed to Windows users, it's also a worthwhile upgrade for DOS users. Version 7.5 includes Windows installation, configuration, and reporting tools. But behind the pretty interface are several notable DOS improvements.

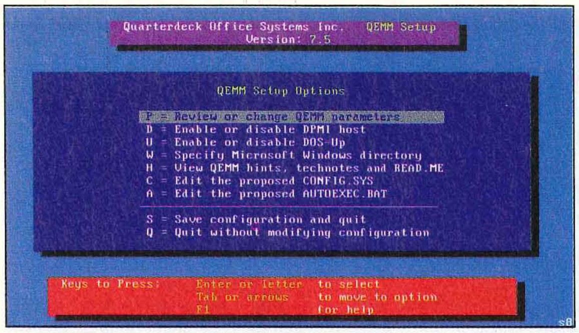


Improved memory-management techniques provide more conventional memory for your DOS programs, plus you'll also get enhanced support for Stacker, DoubleSpace, and DriveSpace; additional reporting capabilities in Manifest; and the ability to undo multiple levels of Optimize changes.

And you just might think the time savings and convenience of QuickBoot alone are worth QEMM 7.5's upgrade price ($34.95).

Memory Mover and Shaker

Quarterdeck has enhanced QEMM's Stealth technology to provide additional upper memory for loading device drivers and TSRs (terminate-and-stay-resident programs). By using the EMS page frame, QEMM can move parts of system and video ROM out of the first megabyte of memory. Stealth has also been revised to be compatible with



```
Quarterdeck Office Systems Inc.   QEMM Setup
            Version: 7.5

           QEMM Setup Options

   P = Review or change QEMM parameters
   D = Enable or disable DPMI host
   U = Enable or disable DOS-Up
   W = Specify Microsoft Windows directory
   H = View QEMM hints, technotes and READ.ME
   C = Edit the proposed CONFIG.SYS
   A = Edit the proposed AUTOEXEC.BAT

   S = Save configuration and quit
   Q = Quit without modifying configuration

Keys to Press:     Enter or letter   to select
                   Tab or arrows     to move to option
                   F1                for help
```

QSetup, QEMM's Setup program (DOS version).

more machines, including IBM Thinkpads, Toshiba portables, and certain Compaq PCs.

From my own experience as a longtime QEMM user, I've found that the new version does a better job of managing memory. I currently have 622K of memory available, after loading ANSI.SYS, my Stacker 3.1 driver, DOSKEY with a 1K buffer, my mouse driver, my disk cache (PCKwik), and my print cache (PCache). That's about 20K more than previous versions of QEMM provided.

QEMM 7.5 also includes improved support for disk compression using DoubleSpace (MS-DOS 6.0), DriveSpace (MS-DOS 6.22), and Stacker.

Stealth DoubleSpace has been renamed Stealth D*Space, and can free 31K to 49K of conventional memory from the DoubleSpace and DriveSpace device drivers. Quarterdeck has worked with Stac Electronics on a new Stacker 4 driver, available free to registered Stacker users. Version 7.5 can load Stacker's buffers into extended memory, saving 8K to 32K and reducing Stacker's conventional-memory footprint to as low as 10K.

Adapting to Change

The Optimize program, which automatically configures conventional and upper memory, will now detect and accommodate memory addresses used by PCMCIA cards. A new feature of Optimize is the ability to undo multiple levels of changes. Whenever you run Optimize, QEMM creates a backup of your previous configuration—AUTOEXEC.BAT, CONFIG.SYS, and called batch files. The installation process also creates a backup of the configuration before you installed QEMM. By running Optimize with the /RESTORE switch, you can restore any of your nine most-recent configurations, or the configuration before QEMM's installation.

QEMM has always come with Manifest, Quarterdeck's system reporting and diagnostic program. Version 7.5 includes Manifest 3.0, which offers both DOS and Windows interfaces. This updated version provides new reports on hardware IRQs and PCMCIA devices. Under Windows, it will list information on memory and system resources used by Windows itself and by active programs.

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Circle 159 on Reader Service Card

A Warm-Boot Sizzler

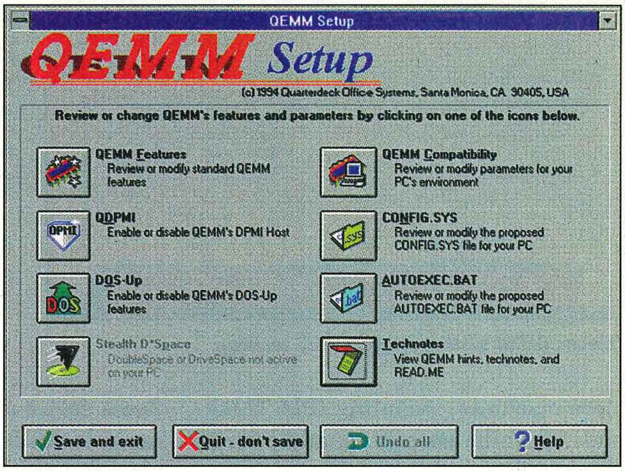
Another new and handy feature is QuickBoot, activated by pressing Ctrl+Alt+Del twice. QuickBoot is a hardware and BIOS initialization program that significantly reduces the time needed to warm-boot.

On my PC, QuickBoot gets me to the "Starting MS-DOS" prompt in 2.4 seconds, versus 21 seconds for a regular warm boot.

Since Optimize needs to reboot your PC several times as it configures your system, QuickBoot speeds up the optimization process.

QEMM 7.5
List price: $99.95;
upgrade $34.95
Quarterdeck Office Systems
150 Pico Boulevard
Santa Monica, CA 90405
310-392-9851

Quarterdeck initially reported some problems installing and running QEMM under Windows, and running Optimize in certain configurations. Problems tend to occur with file dates before 10-12-94, and include the Windows installation failing with a "QWINST.QIX not found" error, the inability to open applications under Windows when using a memory-lending disk cache, a K.COM or GOODRICH@QDECK.COM invalid parameter message when running Optimize, and Optimize failing to detect a network card properly. If you have any of these problems, contact Quarterdeck's technical support for the QEMM 7.5 upgrade disk dated 10-12-94. ■



(c) 1994 Quarterdeck Office Systems, Santa Monica, CA. 90405, USA

Review or change QEMM's features and parameters by clicking on one of the icons below.

QEMM Features
Review or modify standard QEMM features

QEMM Compatibility
Review or modify parameters for your PC's environment

QDPMI
Enable or disable QEMM's DPMI Host

CONFIG.SYS
Review or modify the proposed CONFIG.SYS file for your PC

DOS-Up
Enable or disable QEMM's DOS-Up features

AUTOEXEC.BAT
Review or modify the proposed AUTOEXEC.BAT file for your PC

Stealth D*Space
DoubleSpace or DriveSpace not active on your PC

Technotes
View QEMM hints, technotes, and READ.ME

Windows version of QSetup.

Ken Johnson is training and support manager at the law firm of Mayer, Brown & Platt in Chicago. He's a columnist and writer for several business and computer-law publications and serves as a contributing editor of the American Bar Association's NETWORK 2d *newsletter.*

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540MB	$255
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486DX33 CPU VLB	$230
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32MB SIMM 72 pin 60/70ns	CALL

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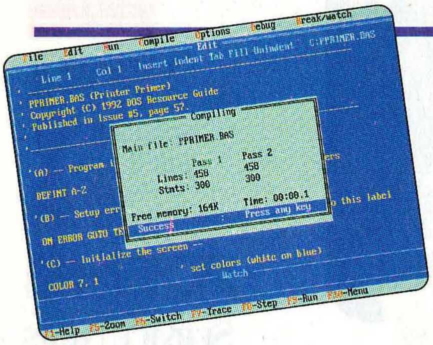

```
' PPRIMER.BAS (Printer Primer)
' Copyright (C) 1992 DOS Resource Guide
' Published in Issue #5, page 57.
'
'(A) -- Program i                                  ers
DEFINT A-Z
'(B) -- Setup err                                  o this label
ON ERROR GOTO TE
'(C) -- Initialize the screen --
COLOR 7, 1                     ' set colors (white on blue)
```

```
Compiling
Main file: PPRIMER.BAS
              Pass 1      Pass 2
     Lines:   458         458
     Stmts:   300         300
Free memory: 164K         Time: 00:00.1
Success                   Press any key
```

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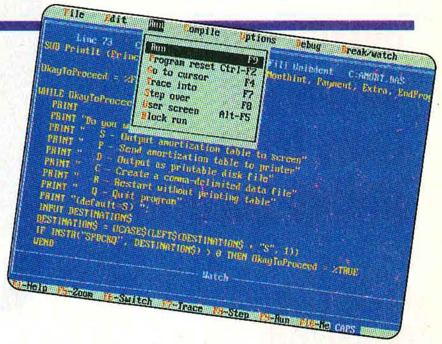

```
SUB PrintIt (Princ                                 MonthInt, Payment, Extra, EndPre
OkayToProceed = %F
WHILE OkayToProce
  PRINT
  PRINT "Do you w
  PRINT "   S - Output amortization table to screen"
  PRINT "   P - Send amortization table to printer"
  PRINT "   D - Output as printable disk file"
  PRINT "   C - Create a comma-delimited data file"
  PRINT "   R - Restart without printing table"
  PRINT "   Q - Quit program"
  PRINT "(default=S) ";
  INPUT DESTINATION$
  DESTINATION$ = UCASE$(LEFT$(DESTINATION$ + "S", 1))
  IF INSTR("SPDCRQ", DESTINATION$) > 0 THEN OkayToProceed = %TRUE
WEND
```

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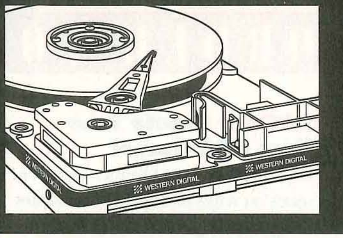

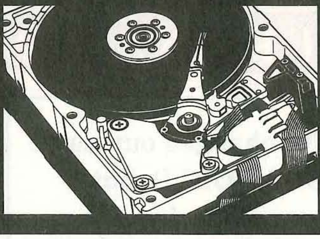

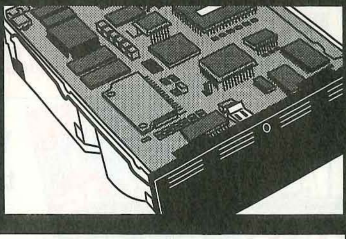

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4294MB	8ms	MC3243	$2039
9100MB	12ms	MC1991	$3299

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4294MB	8ms	MC3243AV	$2179
9100MB	12ms	MC1991AV	$3439

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1083MB	12ms	ST31220A	$475

SCSI (WIDE SCSI also available)

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1700MB	9ms	ST11900N	$1019
2145MB	8ms	ST12550N	$1149
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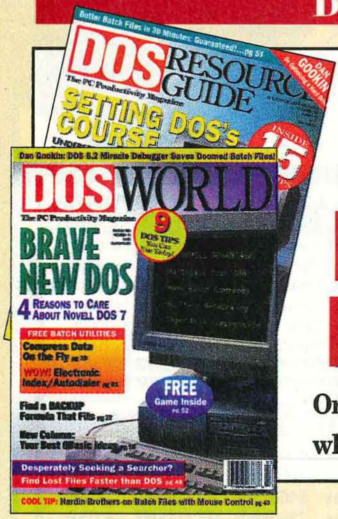

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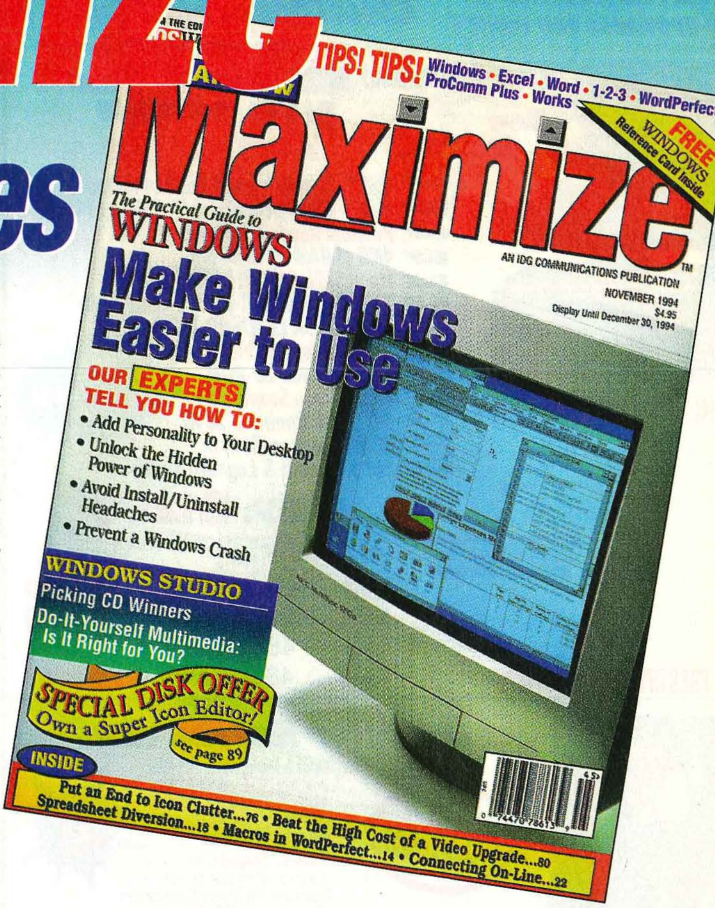
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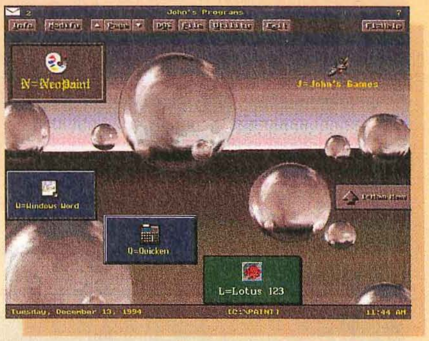

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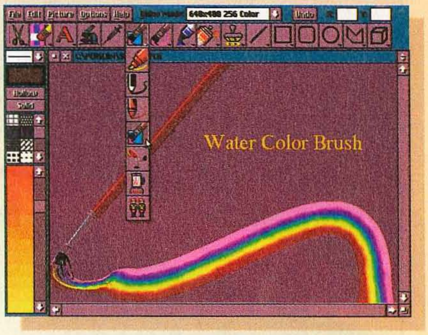

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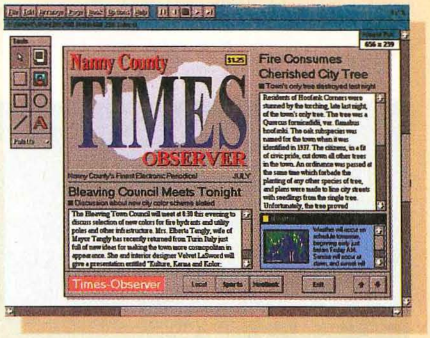
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VENDORS: Listings in the **DW MARKETPLACE** are sold by the column inch. *For more information or to place your ad, contact Linda Guyette or Laurie Donohue at* ***800-343-0728*** *or* ***603-924-0200.***

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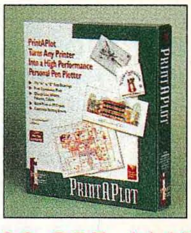

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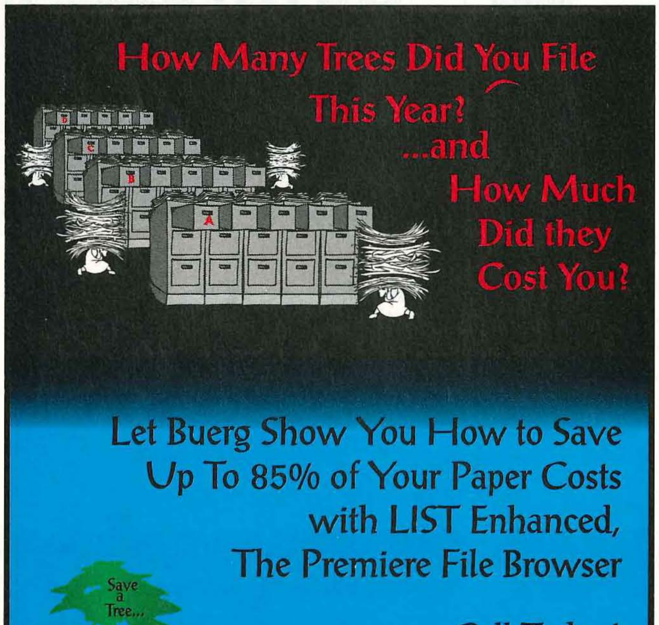

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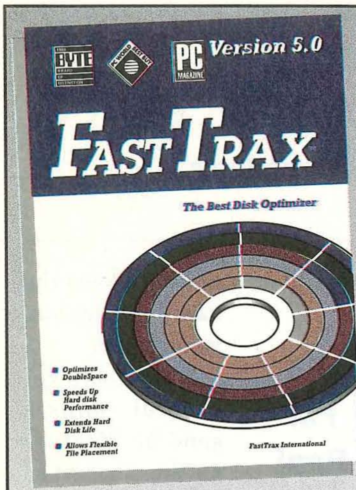

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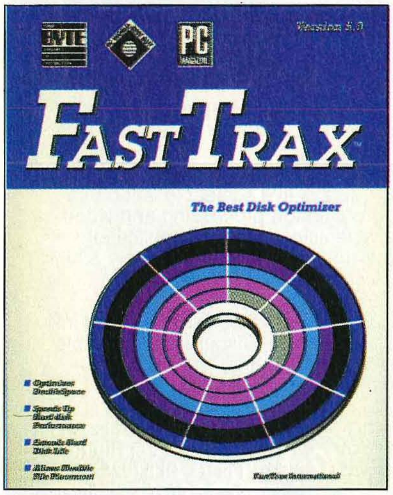


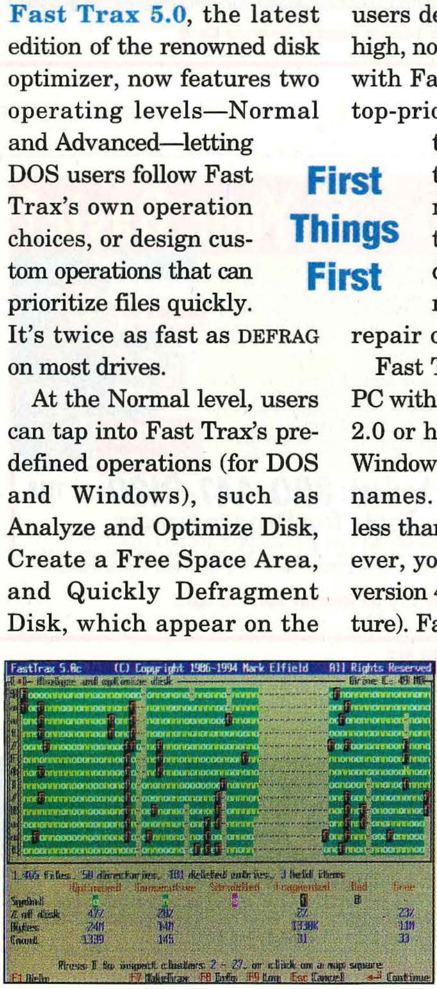
First Things First

Fast Trax 5.0, the latest edition of the renowned disk optimizer, now features two operating levels—Normal and Advanced—letting DOS users follow Fast Trax's own operation choices, or design custom operations that can prioritize files quickly. It's twice as fast as DEFRAG on most drives.

At the Normal level, users can tap into Fast Trax's predefined operations (for DOS and Windows), such as Analyze and Optimize Disk, Create a Free Space Area, and Quickly Defragment Disk, which appear on the main menu. At the Advanced and Normal levels, power users can create their own operations, called *worksheets*, which will then appear on the main menu. In this mode, DOS users can sort directories by multiple keys, move system and hidden files, and combine disk optimizing functions.

The Advanced level is designed to let users designate files as top, high, normal, or low priority, with Fast Trax locating the top-priority files closest to the FAT (file allocation table). Also of note, version 5.0 tests and repairs disk surfaces, with manual or automatic repair of bad free clusters.

Fast Trax 5.0 runs on any PC with PC DOS or MS-DOS 2.0 or higher, and supports Windows95 and NT long filenames. If your system has less than 2MB of RAM, however, you'll still have to use version 4.0 (no Advanced feature). Fast Trax 5.0, $70, upgrades starting at $30 for current users, $40 for users of competitive products; Fast Trax International, 880 Ensenada Ave., Berkeley, CA 94707; 510-525-3510 or fax/BBS 510-525-3125.



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A good-luck charm to ward off computer viruses? Fantaisie, a Canadian company, is selling fluorescent-green badge-like pet viruses; the "girl" is called Iris and the "boy" is Sirus. They don't pin to your lapel, but you can attach them to your monitor to keep those nasty viruses out of your system.

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Okay, I Get the Hint—DOS Is Still Boss

Responding to demand from DOS users, Mark Perkel, president of Springfield, Missouri-based Computer Tyme, has developed a utility he calls BatZap, which allows network administrators more control in updating their batch files.

This smart script language comes on the heels of the software-development company's INI file manager for Windows, called IniTyme.

To try before you buy, you can download BatZap from Computer Tyme's BBS: (417) 866-1665.

BatZap, $95; Computer Tyme, 411 North Sherman, Suite 300, Springfield, MO 65802; 417-866-1222.

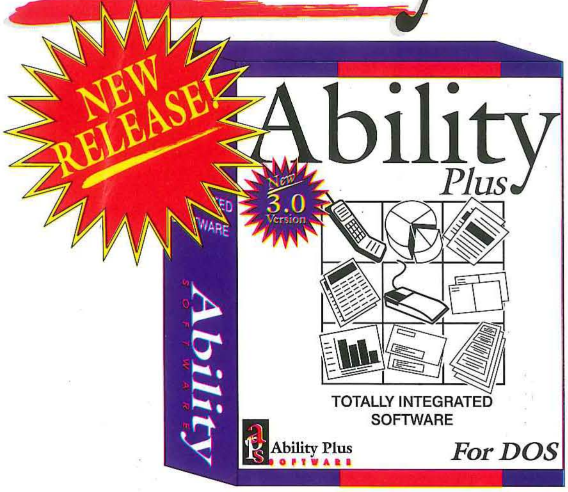
UNDER THE WIRE . . .

■ IBM has begun beta-testing its **PC DOS 7**, with hopes of a commercial release this spring. Among the enhancements expected: Stacker 4.02 compression software; a more versatile text editor; improved conventional memory.

■ A new remote-access disk drive has been designed to make it easier to share data with other computers. Communications Software Inc.'s **Rad^2-Link** allows computer-to-computer communication either via serial or parallel cables, or remotely via modem. Designed to work with DOS or Windows. Call 800-707-9505.

■ **911-Recover**, a new data-recovery system targeted for early 1995 release by Micro 2000 of Glendale, California, is designed to salvage data even if your FATs are completely corrupted or unreadable. The manufacturer promises 911-Recover will identify and then repair all data-recovery problems. Call 818-547-0125.

Ability™ 3.0 for DOS



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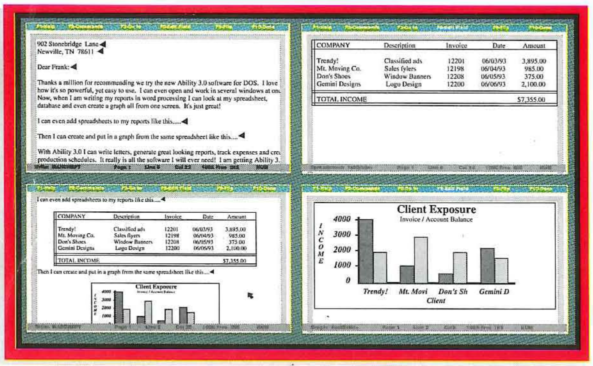

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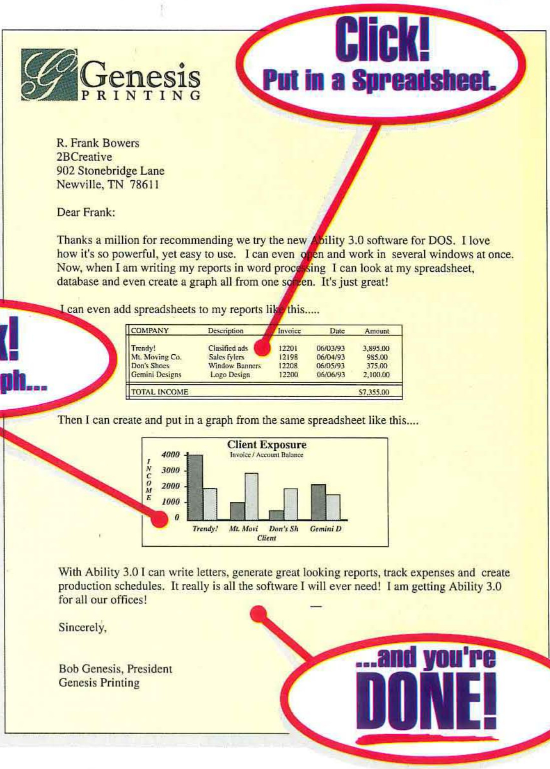

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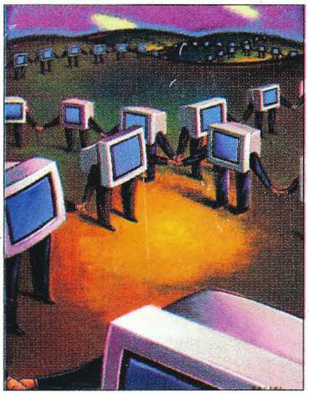
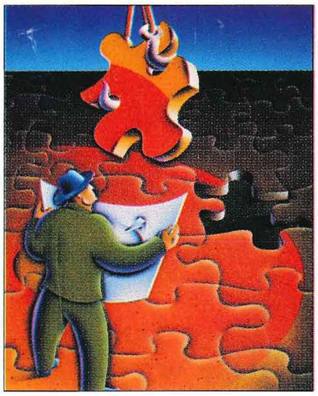
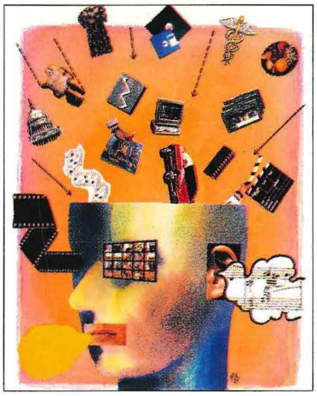


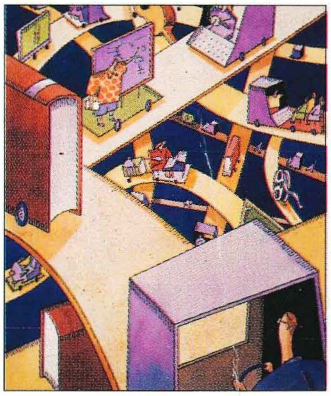
Network utilities—vital, but set aside 100K



DOS 6 utilities—handy, but about 120K



Multimedia—fun, but can you spare 50-80K?



Internet utilities—where will you get 120K?

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MemMaker, the memory utility that comes with DOS 6, does an OK job of delivering additional memory, but it just hasn't kept up with demanding users.

Say you wanted to run a mouse, sound card, SmartDrive, your DOS 6 and Novell utilities, and your Microsoft Bookshelf '94 CD ROM. You couldn't with MemMaker. Not unless you were willing to manually 'tune' it. And then you might end up with 490K or so to use. But QEMM 7.5 routinely returns 634K of conventional memory. And when you consider as little as one 'K' of memory makes the difference between a program loading or not, you can see where an additional 140K or so could be vital.

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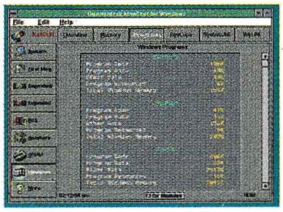

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